The Journal

OF THE

AMERICAN DENTAL ASSOCIATION

CONTENTS

Edward J. Jennings, D.D.S. ..... Frontispiece

ORIGINAL COMMUNICATIONS

Factors in the Position of the Mandible.
John R. Thompson, D.D.S., M.S.D., M.S., and Allan G. Brodie, D.D.S., Ph.D... 925
Osteoma of the Mandible: Report of a Massive Tumor.
Raymond S. Rosedale, M.D., M.Sc. (Med.), and Wesley B. Hargraves, D.D.S... 942
Orthodontics and Dentistry in Latin America.
Samuel Fastlicht, D.D.S. 945
Periodontal Diseases.
Bernhard Gottlieb, M.D. 955
Silicate Cements.
William A. Garrett, D.D.S. 960
Surgical Problems Involving the Mandibular Nerve.
Wilton W. Cogswell, D.D.S. 964
Utilization of Vitallium Appliances to Treat Edentulous Mandible Fractures.
C. M. Logsdon, D.D.S. 970
Complications Associated with the Third Molar Teeth.
James R. Cameron, D.D.S. 979
Dentistry's Obligation to Society—What Can We Do?
L. T. Hunt, D.D.S. 984
The Oral Manifestations of Syphilis.
Thomas J. Cook, D.D.S. 991
Sulfathiazole in the Treatment of Fractures of the Mandible.
Thomas R. Haddock, D.D.S. 1002
A Consideration of Denture Base Materials and a Technic for Their Use.
I. Lester Furnas, D.D.S. 1005
Is Chewing Gum a Safe Dental Therapeutic Agent?
Louis M. Fleisch, D.D.S. 1011
The Need of Cooperation in Professional Fields.
Leroy M. S. Miner, D.M.D., M.D., Dr.P.H. 1017
Effects of the Barbiturates.
John C. Gable, D.D.S. 1021
Relation of Fatal Subacute Bacterial Endocarditis to Tooth Extraction.
Arthur J. Geiger, M.D. 1023
Space Maintainers.
Henry E. Colby, D.D.S.; William J. Simon, D.D.S., and
Harold C. Wittich, D.D.S. 1025

EDITORIAL DEPARTMENT

The Use of the Sulfonamide Compounds in Dentistry 1031
Death of Dr. John P. Buckley 1034
Death of Dr. W. E. Cummer 1034

Bibliographical 1035

ASSOCIATION ACTIVITIES

President's Message—Committee on Dental Preparedness—Bureau of Public Relations—Council on Dental Therapeutics—Council on Dental Education—Committee on Legislation—Committee on Economics—News Items—American Dental Association .....
..... See Special Contents for Association Activities, page 1036

OBITUARIES

Samuel C. G. Watkins, D.D.S. 1095
Charles Bunting Colson, M.D., D.D.S. 1096
Leonard F. Pogue, D.D.S. 1097
George Evans 1097
Deaths 1099
Current Literature 1100

INCIDENTS OF PRACTICE

Cleaning and Keeping Clean Luer and Other Hypodermic Needles. E. E. and
F. J. Svoboda, D.D.S. 1110
Galvanic Action in the Mouth: Report of Case. Murray N. Rubinstein, D.D.S. 1110
Dens in Dente. Morton A. Loring, D.D.S. 1111
Removal of a Root Fragment. Jack Shobin, D.D.S. 1111

Questions and Answers 1112
Announcements 1114

ADVERTISEMENTS

Index to Advertisements A-53
Classified Section A-42

The Journal of the American Dental Association. Vol. 29, No. 7. Published by the American Dental Association, 212 East Superior St., Chicago, Ill. Yearly subscription $5.00. Single copy fifty cents. Entered as second-class matter, January 30, 1939, at the postoffice at Chicago, Ill., under the act of August 24, 1912. Published semimonthly.

Copyright, 1942, by the American Dental Association.

AMERICAN DENTAL ASSOCIATION

OFFICERS AND BOARD OF TRUSTEES (1941-1942)

OREN A. OLIVER, President, Ex-Officio.....Medical Arts Bldg., Nashville, Tenn.
J. BEN ROBINSON, President Elect, Ex-Officio.....42 S. Greene St., Baltimore, Md.
HARRY B. PINNEY, Secretary, Ex-Officio.....212 E. Superior St., Chicago, Ill.
R. H. VOLLAND, Treasurer, Ex-Officio...First Capital Nat'l Bank Bldg., Iowa City, Iowa
E. G. MEISEL, '44.....121 University Place, Pittsburgh, Pa.
HOWARD C. MILLER, '44.....55 East Washington St., Chicago, Ill.
C. J. WRIGHT, '44.....American State Bank Bldg., Lansing, Mich.
EDWARD J. JENNINGS, '44.....126 West State St., Trenton, N. J.
CLYDE E. MINGES, '44.....Rocky Mount, N. C.
PHILIP E. ADAMS, '43.....106 Marlboro St., Boston, Mass.
H. B. WASHBURN, '43.....488 Lowry Bldg., St. Paul, Minn.
HOWARD E. SUMMERS, '43.....1015 First Nat'l Bank Bldg., Huntington, W. Va.
CARLOS H. SCHOTT, '43.....1004 Neave Bldg., Cincinnati, Ohio
HARVEY J. BURKHART, '42.....Box 879, East Avenue P. O., Rochester, N. Y.
FRED J. WOLFE, '42.....Maison Blanche Bldg., New Orleans, La.
RUSSELL A. SAND, '42.....Fargo, N. D.
D. W. McLean, '42.....2585 Huntington Drive, San Marino, Calif.

SECTION CHAIRMEN

OPERATIVE DENTISTRY, MATERIA MEDICA AND THERAPEUTICS
E. M. Jones.....122 E. 16th St., Los Angeles, Calif.

FULL DENTURE PROSTHESIS
W. W. Hurst.....2165 Adelbert Road, Cleveland, Ohio

PARTIAL DENTURE PROSTHESIS
Oliver C. Applegate.....216 S. State St., Ann Arbor, Mich.

ORAL SURGERY, EXODONTIA AND ANESTHESIA
J. Holden Beckwith.....Ingraham Bldg., Miami, Fla.

ORTHODONTICS
L. B. Higley.....705 S. Summit St., Iowa City, Iowa

PERIODONTIA
Hunter S. Allen.....Comer Bldg., Birmingham, Ala.

DENTISTRY FOR CHILDREN AND ORAL HYGIENE
Kenneth A. Easlick.....University of Michigan, Ann Arbor, Mich.

HISTOLOGY, PHYSIOLOGY, PATHOLOGY, BACTERIOLOGY AND CHEMISTRY (RESEARCH)
Hermann Becks.....University of California, San Francisco, Calif.

STANDING COMMITTEES (CHAIRMEN)

JUDICIAL COUNCIL.....Ernest G. Sloman, 344-14th St., San Francisco, Calif.
COUNCIL ON DENTAL EDUCATION..M. Webster Prince, 7634 Dexter Blvd., Detroit, Mich.
PUBLIC HEALTH AND EDUCATION.....F. C. Cady, U.S.P.H.S. Hospital, Lexington, Ky.
DENTAL LEGISLATION.....A. B. Patterson, Morris Bldg., Joliet, Ill.
RELIEF COMMISSION.....Charles P. Grosby, 317 N. 11th St., St. Louis, Mo.
DENTAL RELIEF FUND.....Fred R. Adams, 55 W. 42nd St., New York, N. Y.
RESEARCH COMMISSION.....M. D. Huff, 1204 Medical Arts Bldg., Atlanta, Ga.
PROCESS PATENT.....M. D. K. Bremner, 25 E. Washington St., Chicago, Ill.
LIBRARY AND INDEXING SERVICE.....John E. Gurley, 350 Post St., San Francisco, Calif.
NATIONAL BOARD OF DENTAL EXAMINERS.....James E. John, Medical Arts Bldg., Roanoke, Va.
MEMBERSHIP.....Paul W. Zillman, 29 Walden Ave., Buffalo, N. Y.
INSURANCE.....A. D. Weakley, 1029 Vermont Ave., Washington, D. C.
ECONOMICS.....R. M. Walls, 48 E. Market St., Bethlehem, Pa.
COUNCIL ON DENTAL THERAPEUTICS.....Harold S. Smith, 180 N. Michigan Blvd., Chicago, Ill.
AMERICAN RED CROSS.....B. Lucien Brun, 827 Park Ave., Baltimore, Md.
HISTORY.....W. Harry Archer, Professional Bldg., Pittsburgh, Pa.
DENTAL MUSEUM.....Henry A. Swanson, 1726 Eye St., N. W., Washington, D. C.
NATIONAL HEALTH PROGRAM COMMITTEE.....Leroy M. S. Miner, 363 Marlborough St., Boston, Mass.
NOMENCLATURE COMMITTEE....Maynard K. Hine, 4931 W. Kamerling St., Chicago, Ill.

EDWARD J. JENNINGS, D.D.S., Trenton, N. J.
Trustee of the American Dental Association from the Fourth District

THE JOURNAL
of the
AMERICAN DENTAL ASSOCIATION

Vol. 29 JUNE 1942 No. 7

FACTORS IN THE POSITION OF THE MANDIBLE

By JOHN R. THOMPSON, D.D.S., M.S.D., M.S., and ALLAN G. BRODIE, D.D.S., Ph.D., Chicago, Ill.

DURING the course of investigations on the normal and abnormal growth of the human head that have been carried on for the past ten years in the Department of Orthodontia at the University of Illinois, there has been a constant recurrence of certain observations pertaining to the mandible. These findings have caused speculation as to the control of the position of this bone. Knowing vaguely of the interest and the controversies that were prevalent regarding the possibilities and limitations of full-mouth reconstruction, we began, two years ago, to study the behavior of the mandible in cases that were being subjected to various types of artificial restoration.

A review of the literature confirmed the impression that there were conflicting schools of thought in regard to the effect on the mandible of losses in vertical dimension, through either attrition or extraction. On the one hand are those who believe that:

1. Such losses cause the mandible to assume a new relation to the maxillae. This new relation may be characterized by a protrusive drifting of the bone or a decrease in the vertical height of the face between nose and chin, with a resulting falling in of the lips.

2. The loss of the "stopping" action of the teeth permits the masseter and internal pterygoid muscles to exert an unopposed pull on the angle of the mandible. This tension gradually flattens the angle and warps the neck of the condyle, causing a lengthening of the bone with consequent projection of the chin.

3. These changes in position of the condyle may, and frequently do, give rise to the so-called syndrome of Costen, the major symptoms of which are joint pains, clicking noises and deafness of varying degrees.

On the other side of the question are found men whose views are opposed to one or more of these various points.

From the Department of Orthodontia, University of Illinois.

Read at the Greater New York Dental Meeting, New York City, December 3, 1941.

FULL DENTURE RESTORATIONS

Case	Before Dentures					After Dentures				
	Before Extraction	After Extraction	Edentulous			Dentures			Edentulous	
			1	2	3	1	2	3	1	2
42			111.5			[2]115*	[13]109*	111.5	112	111.5
30			107	[2]106.5	107	[2]108.5*	[14]104*	106.5		
87			127			126*	[20]124*	126	125	
34	119	[3]121	[1]118			[1]129*	[11]125*		122	119
77	128*					[5]133*			124	
71			109	[2]109		115	111*			
40			116	[4]118		[4]116*	[9]115*		120	
80			116	[3]118		[11]116*	118	116.5*	118	[8]118
65			125			122.5*	[12]122*		125	
67			112	[3]112		117.5*	[11]117*	[8]117*	113	[8]111.5
94	129	[8]124				129	[8]122*		127	
70	129	[4]127				129*	[9]129*	[8]129*	128.5	
87			127			[4]126*	[10]124*	126	125	
85			117	[2]113		114*	[20]114*	[20]119		
93	134					133*	[17]125*	131		
74			120.5			[7]122*	[14]119*	121	120.5	
76	127	[22]125				124*	129	[1]129	[2]129	
39			126	[2]128		131	126*	[21]124.5*	128	
134			106.5	[2]106.5	106.5					

PARTIAL DENTURES

Case	Before Partial Dentures			After Partial Dentures		
2		135	[4]136*	[9]134.5*	136	
86		125*	[4]127*	[10]125*	127	
47		120.5*	[2]122	[8]120.5*	[5]120*	122.5
31		115.5*	[2]116.5	[15]115.5*	118	
102	124	[1]124.5	121.5*	121.5*	[22]121.5*	124

Measurements of total face height (N-GN) in millimeters.

Numeral in upper left hand corner of box indicates the number of months that have elapsed since the preceding x-ray examination.

*Teeth, natural or artificial, in occlusion.

Hellman and Weinberger both express their disbelief that changes in the mandibular angle follow loss of teeth. Neiswonger and Gillis maintain that rest position is a result of a coordinate equilibrium between the levator and depressor muscles running to the mandible, and that, in such a rest position, the mandibular teeth are completely out of contact with the maxillary teeth. Tench and Mershon both have pointed out that muscle tissue would probably limit the extent to which any bite could be raised.

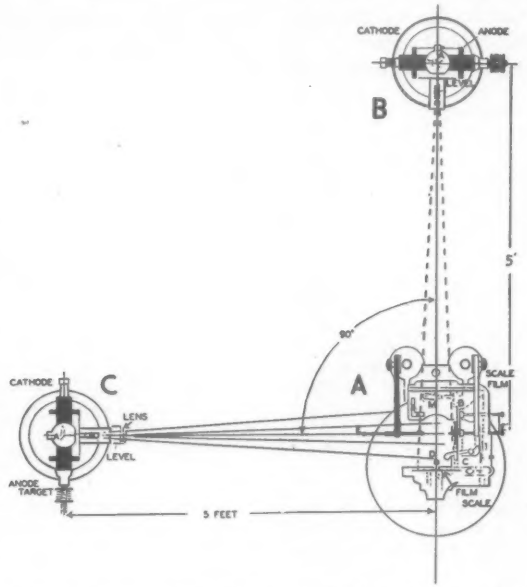


Fig. 1.—Diagram of Broadbent-Bolton roentgenographic cephalometer, showing relation of central rays to lateral and frontal films.

It should be pointed out that most of the demonstrations purporting to show changes in the mandibular angle following loss of teeth have been made on series of dried skulls, in spite of the fact that any study of the human head quickly reveals that there is a great range of variability in each of its characteristics. It is therefore scientifically untenable to select a series of skulls representing any age range and to assert that the differences between them are due to differences in age or to changes in function. In a like manner, it is unsafe to rely on one's impressions when viewing a living patient, regardless of how striking the changes may seem. Nothing short of exact measurements will reveal what has actually taken place. Needless to say, it is impossible to compare the reactions of one patient with those of another.

The studies about to be described were conducted by means of a method that, for the first time, permits taking identical and accurate records of the same individual over long periods of time. This method, given to research by B. Holly Broadbent, of Western Reserve University, was first described in 1930. The technic of the use of this apparatus has already appeared in numerous dental periodicals, and those interested in a detailed description are referred to such sources. For the purpose of this presentation, it seems sufficient to state

that the instrument employed, namely the Broadbent-Bolton cephalometer, is a head-positioning device similar to a craniostat. The head is secured by means of left and right ear posts, which can be inserted in the ear canals and which are calibrated for centering the head in the machine. Orientation of the head in the Frankfort horizontal plane is accomplished by means of a pointer to the left orbitale, the pointer lying at the same level as the top of the ear posts. Once the head is brought to this position, it is locked by means of a rest which engages the bridge of the nose. The base of the cephalometer is immovable and holds a dental chair which can be raised or lowered. Through this arrangement, the subject is positioned to the machine, instead of the machine being adjusted to the subject.

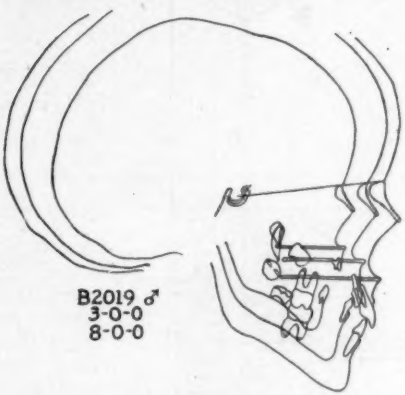


Fig. 2.—Superimposed tracings of head x-ray films at ages 3 months, 3 years and 8 years; showing orderly behavior of growth pattern.

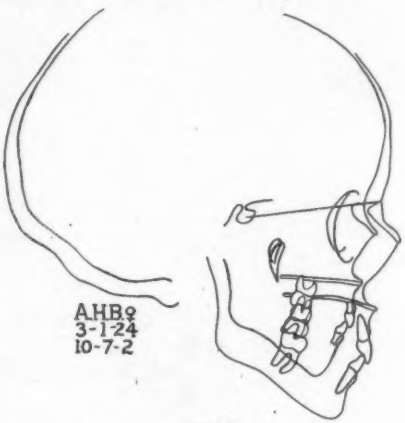


Fig. 3.—Superimposed tracings of case at ages 3 years and 10 years 7 months. There is no change in behavior of the pattern in this range.

Two x-ray tubes complete the assemblage. A diagram representing the machine is shown in Figure 1. One of the tubes is fixed at a 5-foot target distance to one side of the chair and the other at an identical distance to the back of the chair. The two tubes are so adjusted that their central or axial rays cross each other at a true right angle, at the central point of the cephalometer. This is determined by optical methods. The central point of the machine is the point where the midsagittal plane passes between the two ear posts when these are pushed together until they touch. The channels for the reception of the film cassettes are parallel to the midsagittal plane for the lateral picture and to the transmeatal axis for the frontal picture. By this arrangement, the following conditions are obtained:

1. The central ray of the lateral tube passes down the length of the ear posts along their superior surfaces and meets the midsagittal plane and the film surface at true right angles. The central ray of the posterior tube travels along the midsagittal plane at the same horizontal level as that of the lateral ray and meets the transmeatal axis and the frontal film at right angles.

2. The head, being firmly stabilized, can be roentgenographed in two planes without change of position. Merely alternating the cassettes and throwing the current from one tube to the other by means of an overhead switch accomplishes this.

3. Because the foregoing conditions give two pictures taken at exact right angles to each other, it is possible to project from one picture to the other when the films are properly orientated to each other on a suitable transilluminated drafting table.

4. Because the lateral and frontal pictures are taken at the same target distance, and since this distance is 5 feet, the enlargement is not only very slight, but also almost identical in degree in the two pictures, particularly of those areas being studied.

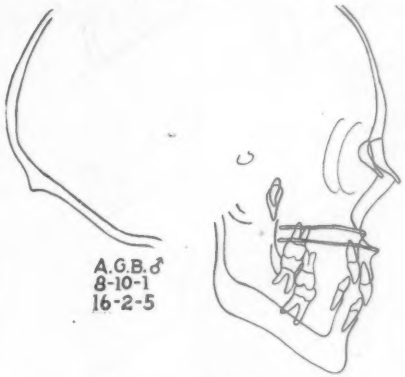


Fig. 4.—Superimposed tracings of case from age 8 years 10 months to 16 years 2 months, at which time full growth had been attained. There is no change attributable to puberty.

In growth studies, head roentgenograms are made quarterly during the first year of life, semi-annually from 1 until 5 years and annually thereafter. In the study of other problems, one may take pictures at any selected intervals, as dictated by the need. In all cases, however, the x-ray pictures are traced accurately and the measurements are made from tracings. In order to show graphically changes that have occurred between the taking of any two pictures, tracings may be superimposed on a transilluminator and the differences noted. The selection of an area for superpositioning constitutes a major problem in growth studies, but, in the adult, there

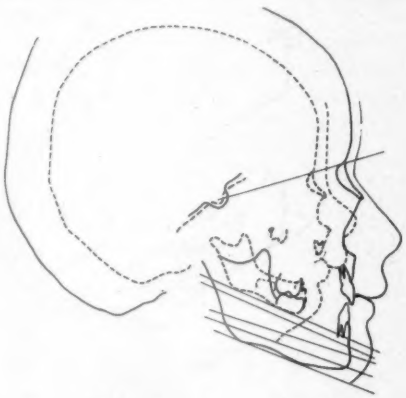


Fig. 6.—Superimposed tracings from case shown in Figure 5 and of same case at age 8 years. The mandible bears the same angular relation with the cranium at both ages. The straight lines on the mandible indicate the position of the lower border at intervening stages.

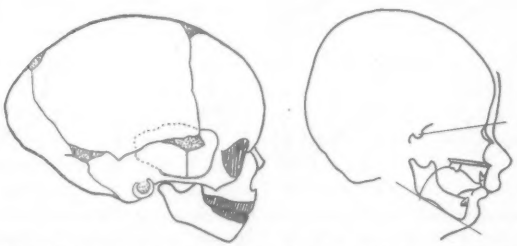


Fig. 5.—Left, widely held concept of relation of jaws at birth. (After Brash.) Right, relation of jaws invariably revealed by x-rays. There is protrusion of the tongue between the arches.

is no question of this sort, and only those parts showing change will fail to register.

A combination of methods, namely the taking of serial roentgenograms and the vital staining of *Macacus rhesus* monkeys, have demonstrated that the anterior cranial fossa is the most stable area of the head. After 4 or 5 years of age, the internal table of the skull in this region can be superimposed with very slight error, and it has therefore been accepted as a basis for all superpositioning when successive pictures of the same individual are being examined. A straight line connecting the center of the sella turcica (S) to the point nasion (N) is employed, with the point S registered. This will explain the figures that have to do with the growth pattern and the method that has been employed in orientating them. Since most of the findings on growth have already been published in fairly complete detail, it will be necessary for the purpose of this paper only to point out certain facts that have been taken as a foundation for the major thesis.

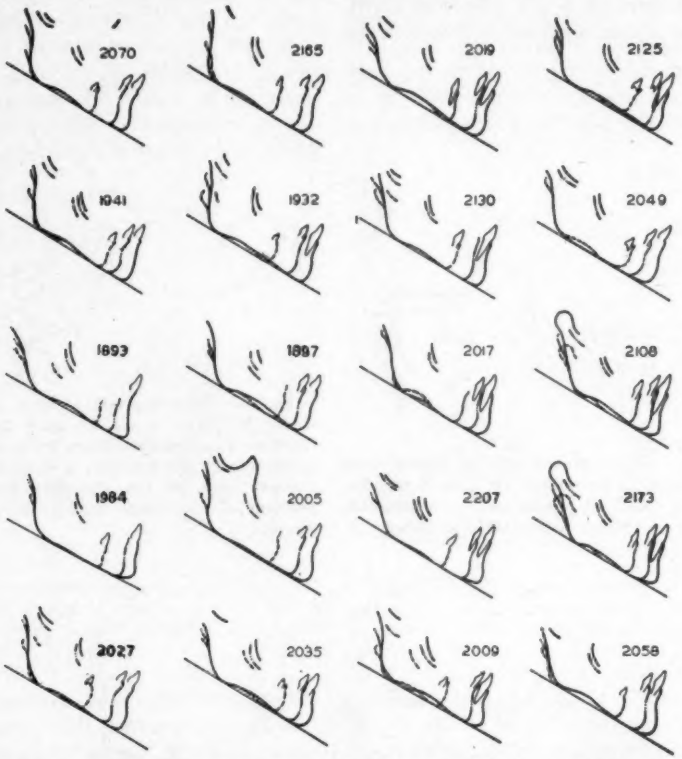


Fig. 7.—Tracings of mandibles of twenty normally growing children selected at random. Each is shown at 3 months, 2½ years and 8 years. There is no change of the angle of the mandible.

Superpositioning shows that successive growth stages of the same individual exhibit a remarkable stability of pattern. (Figs. 2, 3 and 4.) It will be noted, for example, that the floor of the nose, or hard palate, remains at the same angle with the line N-S throughout growth;

in other words, that each succeeding stage is parallel to those that have preceded. In a similar manner, the occlusal plane of the teeth and the lower border of the mandible remain constant in their angular relations with the cranial planes and with each other. In a similar manner, it is found that points such as the anterior nasal spine, the tip of the maxillary central incisor and the chin point travel downward and forward on a series of straight lines. If we connect these various points with a series of straight lines from nasion to chin, we again find that each segment is parallel to its predecessors.

Now there is one part of this picture that must be stressed, particularly for the purpose of what will come later. This pertains to the mandible. The usual illustration of the infant skull shows the mandible and the maxilla in approximation, or at least separated only by their gum pads. The lateral x-ray picture of the living infant never shows these relationships. (Figure 5.) On the contrary, the jaws are always apart and the tongue always protrudes between them, supporting the lips. Indeed, if one closes the jaws by pressure on the chin, the infant will always struggle to free itself, cry and frequently choke. If the angular relation between the lower border of the mandible in a resting infant and the line N-S is measured, the reading will be the same as that obtained (in the same individual) after all of the teeth are erupted. (Fig. 6.) How can this be explained?

In the newborn infant, the tongue is closer to adult size than any other part of the head, except the brain. Its growth, while far ahead of that of the jaws, has almost ceased, while these other parts will continue to grow for from eighteen to twenty years. After birth, there is not much downward growth of the lower border of the mandible; and by the age of 6 years, it has apparently ceased altogether. The alveolar border, however, grows upward at a rapid rate. A similar growth brings the upper alveolar process down. Add to this the eruption of the teeth and the forward growth of the entire facial mask and we can visualize how the tongue comes to be enclosed by

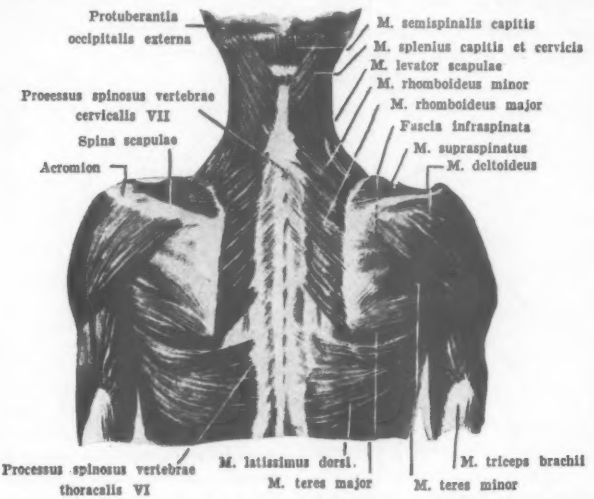


Fig. 8.—Broad muscles of back, showing bilateral symmetry. (After Spaeltholz.)

the growth of surrounding parts without any change in the relative position of the mandible. There is no time when it attains full closure. Roentgenograms of fully grown persons with natural dentures always reveal the teeth slightly out of occlusion.

One might well ask how it is that if the alveolar processes, upper and lower, are growing toward each other and the occlusal plane is being constantly lowered, a stage is not reached where the back teeth would meet and cause a shifting of the occlusal plane or an open bite. The answer lies in the mandibular condyle. Vital staining has shown that this is the most active and persistent growth center in the entire head after birth. It is covered with a cartilage that seems to possess the potential of an epiphysis. As the condyle grows upward, the entire mandible is thrust downward at a rate that enables this bone to maintain an unchanging relationship with the rest of the face. Disturbance of this growth center through a fall or through surgical interference leads to a characteristic deformity and this deformity is not due to loss of function.

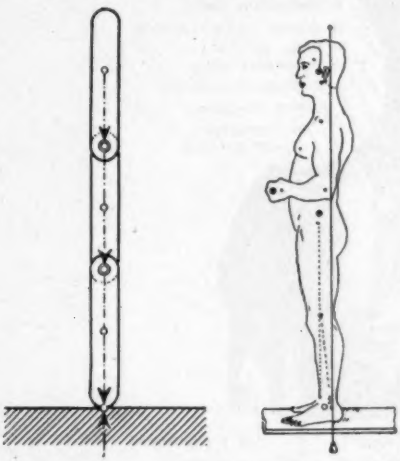


Fig. 9.—Figures from Steindler indicating (left) mechanical arrangement necessary to maintain static equilibrium (axis of gravity must pass through centers of joints) and (right) axis of gravity in upright posture in relation to joint centers.

There is one more item in relation to the mandible which, in view of certain recent publications, cannot be neglected here. Without exception, our anatomy textbooks, as well as many dental authors, state that the angle of the mandible is obtuse at birth, gradually closes toward a right angle form and returns toward the obtuse upon the loss of the teeth—the posterior teeth in particular. Nothing could be farther from the true condition. If one studies the same living children from birth until all of their second teeth except the third molars have erupted, he fails to find in a single individual any change in that portion of the mandible that is called the angle. It is perfectly true that one will find variation in obtuseness or acuteness between individuals, but the angular pattern found in the first x-ray picture of a child will be the same as that found at any subsequent growth stage. This is shown in Figure 7, which represents the growth patterns of the mandibles of twenty children selected at random. There is only one satisfactory way to contradict this statement and that is to pro-

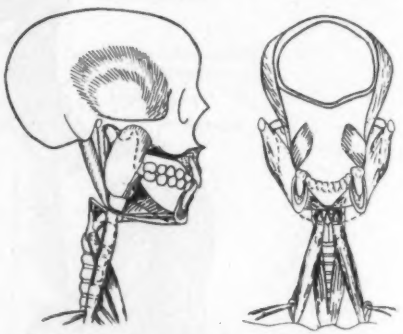


Fig. 10.—Diagrammatic representation of masticatory, suprahyoid and infrahyoid groups of muscles, showing antagonism to postcervical group in maintenance of head posture. The bilateral symmetry in the frontal plane is to be noted.

duce a series of pictures showing that such change has taken place in an individual. It can never be proved by producing a series of mandibles of different individuals.

To summarize the evidence thus far, then, we may say that:

1. The pattern of the head of the individual is laid down before the third month of postnatal life, probably very much earlier, and thereafter does not change.

2. The growth of the various bones comprising the head, although highly individualized for each, is so integrated that the various anatomic points travel in straight lines.

3. The proportions of the three areas of the face, i.e., nose, upper alveolar and dental areas and mandible, have a strong tendency to remain constant.

4. The angles formed by the various planes of the face with those of the cranium are the most stable of all relations.

5. The mandible assumes its preordained relation with the rest of the face and head long before any teeth have erupted, and this position is constant and characteristic for the individual.

When search is instituted for an explanation of the stability of this bone, which by its very structure and relations appears most unstable, it becomes immediately apparent that factors other than dental and bone relationships must play a dominant rôle. Only one tissue comes to mind and that tissue is muscle, with its associated nerve control. It is therefore necessary to search in this field for the answer to our problem.

It was thoroughly established by Sherrington that the same motor impulse that caused one set of muscles to contract caused an inhibition of tonus in their antagonists. Thus, the rest position of any movable part may be taken as an equilibrium between all of the forces operating upon it. If these forces happen to be entirely muscular, there is an equal pull on both sides of the part through a state of tonus. Thus, even a rest position must be viewed as a dynamic condition.

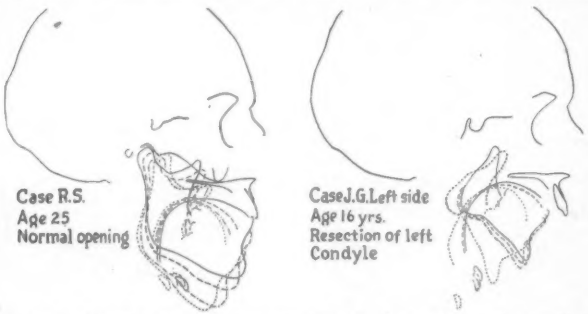


Fig. 11.—Tracings of headplates of two patients at four stages of mouth opening. The normal (left) shows migration of the condyle and stability of the hyoid bone. Condylar resection (right) shows reeducation of the hyoid musculature to permit opening by these groups. Migration of the hyoid bone is evident.

There is no better place to examine or demonstrate this principle than in the upright posture of man. One has no difficulty in visualizing muscular equilibrium when he views such a symmetrical arrangement as the bilateral symmetry of the halves of the back. (Fig. 8.) The problem is quite different, however, when we view the body from the side. In order to have the same static equilibrium obtain here, it would be necessary that the line of gravity pass through the articulating surfaces on all of the joints supporting the body. Steindler has pointed out in his "Normal

and Pathologic Locomotion of Man" (Fig. 9) that the center of gravity actually passes through none of the joints and that therefore there must be an antagonism set up by the powerful musculature of the back on the one hand, and the musculature plus the force of gravity in front. The truth of this contention is beautifully shown when a person faints while standing erect. The knees and ankles buckle and the body pitches forward. Steindler points out that for every movement of the body, there is a definite amount of inertia to be overcome, a definite amount of balance to be disturbed. In many parts, the body is so designed that the force of gravity initiates movement, as in walking. Here we permit ourselves to relax and we start to fall forward, catching ourselves with one foot or the other. Walking, then, becomes a matter of alternating falling forward and placing the foot to stop the fall.

In the case of the head, we have an even more complicated system. (Fig. 10.) Here we have what amounts to a globe set on top of a column of spools—hardly a stable arrangement. It is easy to see and understand the action of the postcervical muscles, and were there another similar group running from the front of the head, in the region of the forehead, to the thorax, we could readily understand the resulting balance. We know that we have the balance, but we have no such group of muscles. How, then, is the posture of the head maintained? In the head, the greater part of the weight lies anteriorly from the axis, the head falling forward when complete relaxation occurs. Thus, gravity does at least part of the work of balancing the head.

When search is made for the more dynamic factors of resistance to the powerful postcervical group, it is found that a series of muscle groups act together. Each group has its own specific function or functions, but at least part of its work is this cooperative effort in behalf of posture maintenance. The superior group is the masticatory musculature. Without exception, these muscles have their origin on the cranium and run to a movable bone, the mandible. Thus, they are capable of making a unit of cranium and jaw by clamping them together. A moment's reflection reveals, however, that even now they would not antagonize the posterior neck muscles. Without connection between

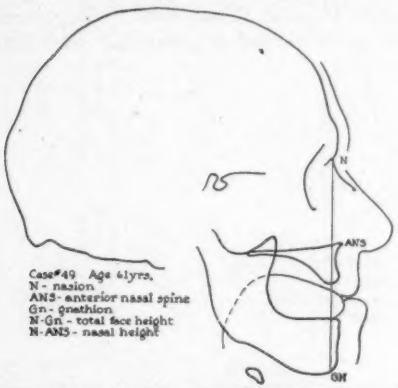


Fig. 12.—Tracing of edentulous case, indicating line of measurement of total face height.

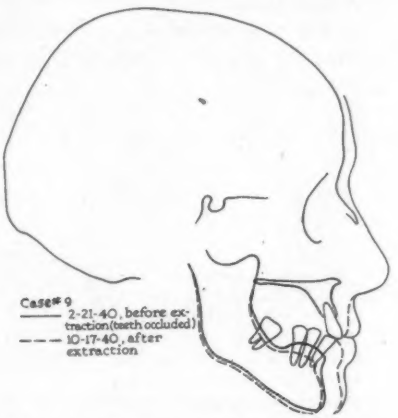


Fig. 13.—Tracing indicating facial change following extraction. The rest position of the edentulous mandible is lower than that with the teeth in occlusion.

mandible and thorax, the head would be tipped back. This connection is supplied by the suprahyoid and infrahyoid muscle groups, the first running from mandible and cranial base to the hyoid bone and the latter running from hyoid bone to thorax. Thus, we have three muscle groups that span the gap between cranium and operating base, or thorax, and controlling two movable bones.

Let us now imagine the head being held normally and motionless in the position of erect posture. Such a position is maintained by the antagonistic pull of the muscles of the back of the neck on the one hand, and the force of gravity plus the three enumerated sets working together on the other hand. Suppose we disturb this balance by swallowing. In deglutition, it is necessary to elevate the hyoid bone, which means the contracting of the suprahyoid muscles. If this group is contracted, it would have just as strong a tendency to depress the mandible as to elevate the hyoid. It seems obvious, therefore, that additional tension must be generated in the masticatory group to prevent the downward displacement of the mandible. The fact that this is true can be easily demonstrated by placing the fingers lightly on the temples and swallowing. At the instant of elevation of the hyoid, a pulse of contraction will be felt in the temporalis.

A similar phenomenon may be demonstrated in mastication. In spite of the rather extensive and violent movements of the mandible, the hyoid bone is relatively stable. Indeed, it is only in wide opening movements that the hyoid bone shifts to any extent, and even this shift is unexpected. The excellent fluoroscopic moving picture "Physiology of Mastication," by Klatsky, shows these points.

Thus it is seen that the muscles lying anteriorly from the vertebral column, i.e., the masticatory, suprahyoid and infrahyoid groups, have, as their rôles, not only their own specific functions, but also a team play behind these which helps to maintain the posture of the head. This coordination permits of mastication, deglutition and speech without any accompanying nodding of the head. We have been thinking of the mandible too much as a bone concerned with a single function, rather than as a connecting link in this anterior muscle chain. The muscle tension acting on the mandible is balanced; that is, there is just as much downward pull as there is upward pull on this bone.

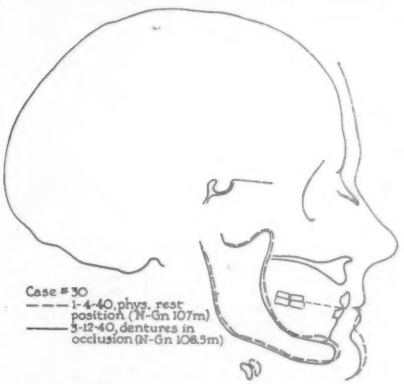


Fig. 14.—Superimposed tracings of case at physiologic rest and with dentures in place. With the teeth in occlusion, the mandible is forced below its rest position.

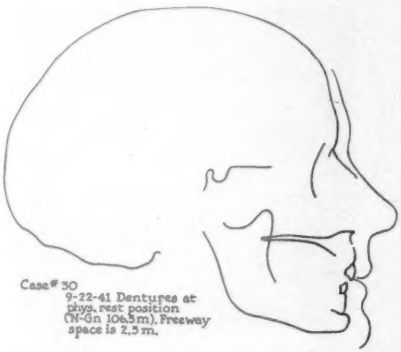


Fig. 15.—Tracing of case shown in Figure 14 from x-ray film taken one year and four months later. Measurements reveal not only that the mandible has returned to its former level, but also that freeway space now exists.

Investigations by one of us on the opening movements of the mandible have given added evidence in this regard. In normal opening, it has been found that the external pterygoid muscle plays the major rôle by pulling the head of the condyle downward and forward, while the hyoid bone is maintained at a constant level. This means that this particular muscle is contracting while the other three muscles, namely masseter, internal pterygoid and temporal, although controlled by the same nerve, are relaxing. The suprahyoid group tenses only enough to prevent the hyoid from descending. Where the external pterygoid has been interfered with, as in resection of the condyle, the picture is quite different. It is now found that the patient is scarcely able to open the mouth immediately after the operation. As time goes on, however, the suprahyoid and infrahyoid muscles are reeducated and take over the function of depression of the mandible. In order to do this, it is necessary that the infrahyoid muscles pull the hyoid bone to constantly lower levels with each degree of opening in order that mechanical advantage be increased. Such movement is always of the hinge type, and the opening, even after the lapse of a year, is always markedly diminished to below the normal. Figure 11 shows the contrast between the two types of function.

From the foregoing material, we have come to believe that the spatial position of the mandible is an individual characteristic which is as stable as any part or any other relationship. Furthermore, we do not believe that the presence or absence of teeth affects it. But in order to apply these findings and to test our hypotheses under clinical conditions, we began, nearly two years ago, and with the cooperation of the prosthetic department, to follow cases calling for artificial restorations. Approximately sixty cases have been followed to date, including cases requiring partial or full dentures.

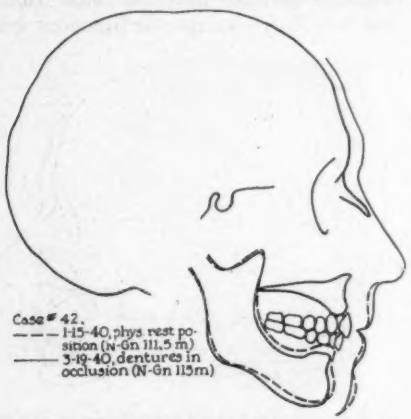


Fig. 16.—Superimposed tracings of case in physiologic rest position and with dentures in place. The mandible is forced to a lower position with the teeth in occlusion.

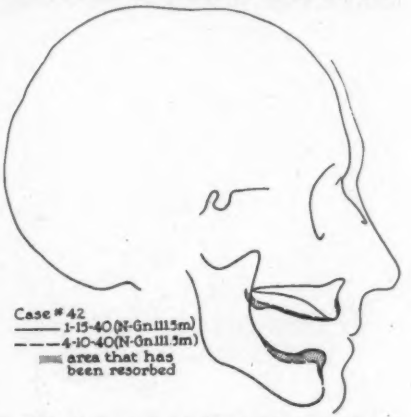


Fig. 17.—Tracing showing alveolar resorption that occurred in case shown in Figure 16 over a period of thirteen months after insertion of dentures.

The procedure consisted of taking cephalometric roentgenograms when the patient was first seen; that is, before extraction, if this was necessary, or before any impressions were taken. In these cases, the patient was told to relax, and no reference was made to teeth. He was asked to swallow and the exposure was made about two seconds later. In cases requiring extraction, another headplate

was made just prior to impression taking, and all cases were x-rayed immediately after the dentures were inserted. The patients were recalled at quarterly and semi-annual intervals and roentgenograms were taken both with the dentures in place and with the mouth empty. Figure 12 shows the manner in which the tracings were made and the points that were used for reference. A straight line was drawn connecting nasion and chin point, and the length of this line was taken as total face height. Nasal height was taken as that of the area lying above the level of the anterior nasal spine.

Rechecks on these cases soon made it apparent that the loss of teeth was not causing any change in the rest position of the mandible. However, wide differences were seen in the effect of extraction on different people. In some, the loss of teeth was followed by no great change; in others, the face, from nose to chin, seemed to collapse into the nutcracker pattern that has been held to represent the senile stage. When the reason for this difference was sought, it was found that those patients who seemed to be closing down were actually not holding the mandible in any different position, but were suffering from more rapid alveolar resorption. Furthermore, such resorption affected not only the height of the processes, but the thickness as well. The labial plate seemed to suffer equally with the crest so that the lips were robbed of not only the support of the teeth, but also that of the alveolar process. In several cases losses of three-sixteenths inch in height and equal losses in thickness were demonstrated. Figure 13 illustrates the facial change that followed extraction of the incisors in one of the cases. The lips dropped inward because of loss of the lingual support and this made the chin appear to be more prominent. This facial change has frequently been ascribed to a decrease in the vertical dimension. It can be noted, however, that, in this case, the vertical dimension is actually increased in the edentulous x-ray tracings. This was to be expected since the patient had been instructed to close the teeth, while, after extraction, the mandible was at physiologic rest. This rest position was confirmed in an x-ray picture made one month later.

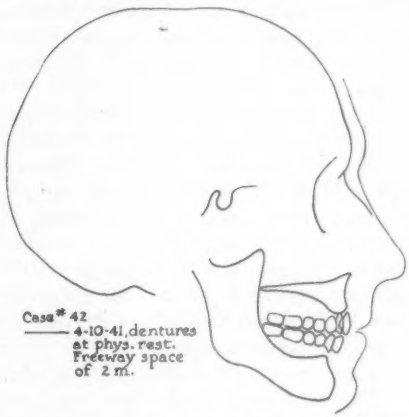


Fig. 18.—Tracing of case shown in Figures 16 and 17, taken thirteen months after insertion of dentures. The mandible has returned to the original rest position and a freeway space exists.

Fig. 19.—Model of case with deep overbite, as viewed clinically.

In a number of the cases examined, the bite had been unintentionally opened by the dentures. Thus, these roentgenograms with dentures in place revealed an increase in height over that which would

have been indicated by the rest position. In all these cases except one, the alveolar process underwent sufficient resorption not only to permit the mandible to return to its position of physiologic rest, but to provide a free-way space besides. In the one case referred to, the opening of the bite has been successfully maintained for one year, a fact that we can explain only on the basis of a high degree of accommodation.

Two typical cases in which the bite was opened by means of full dentures will be reported in detail. Neither of these cases had been subjected to recent extraction. The preliminary resorption

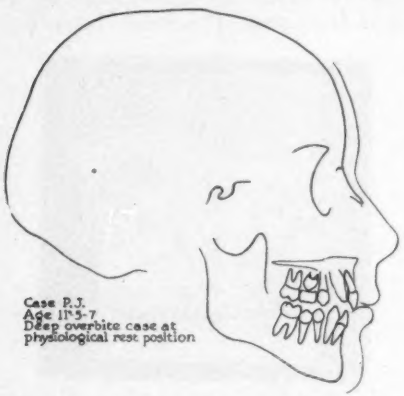


Fig. 20.—Tracing of case shown in Figure 19, indicating normal overbite when mandible is at rest position.

that follows extraction had already taken place.

Case 30 was that of a woman aged 52. Figure 14 is a tracing of the cephalometric roentgenogram of the case with the edentulous mandible in the position of physiologic rest. The tracing is superimposed on the tracing of the roentgenogram with the dentures in place. Reference to the table will reveal that the total face height with the mandible at rest was 107 mm. This rest position was checked with two others in which readings of 106.5 mm. and 107 mm. were obtained. The total face height with the dentures in place and in occlusion, however, was 108.5 mm. Since a free-way space of 2.5 mm. to 3 mm. is the normal condition, we would add this to the 1.5 mm. increase already present and would say that this bite has been opened 4.5 mm.

Figure 15 illustrates the change that occurred in the facial height over a period of one year and four months. The dentures are in place, with the mandible in the physiologic rest position, and the chart indicates that total face height is 106.5 mm. Free-way space of 2.5 mm. exists, so that, with the dentures in occlusion, the face height would be 104 mm.

Case 42 was that of a woman aged 53. The physiologic rest position yields a face height of 111.5 mm., a reading that was confirmed by two other pictures. Figure 16 represents a tracing of the edentulous mandible at physiologic rest superimposed on that with the dentures in place. The bite had been opened about 6 mm. In a year and one month, a considerable amount of resorption of the underlying bone occurred, as indicated in Figure 17, and this permitted the bite to close down until the mandible was again within the limits of the physiologic rest position, and a free-way space of 2 mm. had been established. (Fig. 18.)

The table gives the readings made on a number of other cases for which no illustrations have been prepared. Scrutiny of the figures will reveal that all but one of these cases behaved in an identical manner.

The partial cases were similarly illuminating. Here, we found that when the bite had been raised by such restorations, the mandible returned to its normal position even though this necessitated the depression of abutment teeth. We have not had the opportunity to examine a full-mouth reconstruction in which all of the teeth have been built up with castings, etc.

We are fully aware of the excellent results being obtained in many cases of

so-called bite opening, and it would seem, at first glance, that this evidence tends to disprove it. This however, is not the case. When the evidence is analyzed, there is no conflict, except in point of view. The error has arisen through the belief that when teeth are lost, the mandible assumes a different relation to the maxillae, being drawn closer to them and giving rise to the various symptoms that are associated in the Costen syndrome. This, we feel, is false. In fact, there was one case in which the bite was raised and the patient complained of most of the symptoms of the Costen syndrome, usually attributed to closure of the bite.

It should be pointed out that during various masticatory excursions, the edentulous jaw may be, and frequently is, overclosed. Roentgenograms showing such overclosure fail to reveal, however, that the condyle is driven into new and damaging positions. The symptoms are probably attributable more to neuromuscular than to mechanical conditions and are identical in nature with those found around any joint when a sudden movement carries a part beyond its usual and coordinated path.

Since a roentgenogram of a patient with a normal denture will invariably show a rest position when the teeth are just out of occlusion, it would seem that efforts at restoration should stop at this same point. It has been interesting to note that, in the vast majority of patients with excessive overbite, the rest position indicates a normal degree of incisal overbite with the posterior teeth as much as one-fourth inch apart. (Figs. 19 and 20.) This would give ample room for the

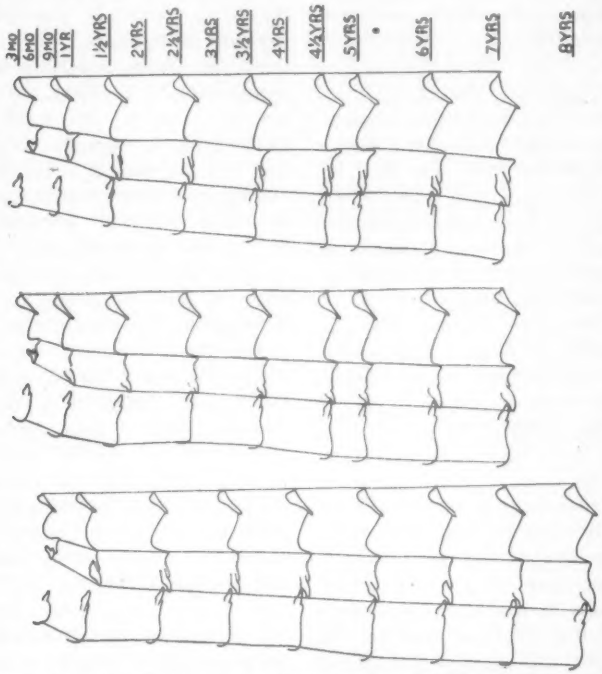


Fig. 21.—Tracings of roentgenograms of profiles of three children from 3 months to 7 or 8 years; showing stability of proportions.

placing of any prosthesis and would, at the same time, prevent overclosure during function.

It was only natural that as all of this material accumulated, the possibility of its practical application to the problems of clinical dentistry was suggested. If this mandible had a fixed position in relation to the face and cranium, the next problem seemed to be to attempt to find how such a position could be determined in any given case. A study of large groups of material of various sorts was therefore undertaken by cross-sectional methods.

The early studies on the growth pattern had shown that there was a remarkable stability in the proportions of the various parts of the face. The first intimation of this was gained when it was found that the average curves representing the growth of the various parts making up the anterior vertical height of the face yielded the same percentages regardless of the age at which they were examined. The nasal height, from nasion to anterior nasal spine in particular, seemed to be very consistent in its behavior, always yielding 43 per cent of the distance from nasion to bony chin point. (Fig. 21.)

To check this finding, the roentgenograms of fifty adult patients were measured, and the same average was obtained, namely 43 per cent (S. D. 1.8). Three hundred skulls of different racial stock were measured at the Field Museum and again a 43 per cent mean was obtained. But it should again be pointed out that the employment of an average or mean value as a yardstick for any given individual is subject to error unless the standard deviation is extremely low. We have found values of from 39 to 50 per cent in this measurement, and, while these are rare, they are enough to warn us that we are not in possession of any magic formula. At present, these measurements are being rechecked, and there is some evidence that an experimental error may explain some of the cases that lie farthest from the mean. The technic under which many of the earlier pictures were taken called for the teeth to be held tightly in occlusion. It seems of possible significance that cases of deep overbite yield the highest percentage for nasal height. With total face height taken as 100 per cent, any decrease in denture height is automatically added to nasal height. Nevertheless, we would still not feel secure in the assumption that every clinical case could be handled by applying these percentages.

For those who are seeking such a guide to this clinical problem, we would suggest that they try the x-ray technic of establishing the position of physiologic rest. To do this, it is not necessary to employ the elaborate equipment that has been described here. The prime requisite is sufficient target distance. If a lateral view is taken at any distance beyond 5 feet, and if the head is so positioned that the sagittal plane is parallel to the film surface, and both of these are at right angles to the axis ray of the tube, a very satisfactory image will be obtained. Nasion, anterior nasal spine and chin point can be readily and accurately located. Since subsequent pictures, taken without accurate control of distance, may yield differences in absolute size, work should be carried on by means of percentages only. Briefly, this means that total face height, or the distance from nasion to chin point, is taken as 100 per cent, with nasal height, or the distance from nasion to anterior nasal spine, expressed as a percentage of total face height. The remainder would constitute the area from anterior nasal spine to chin. If a subsequent picture, with trial dentures or other prostheses in place, yielded the same relative percentages of these two parts when the jaws were in rest position, one should feel reasonably certain that he has not exceeded the limits of the normal physiologic rest position.

SUMMARY

The investigations here reported, we believe, justify our belief that:

1. The form and proportions of the human mandible are determined at a very early age and, once established, do not change.

2. The position of the mandible in relation to the rest of the face and head is an integral part of the pattern of the individual and is just as unchangeable as is form.

3. The presence or absence of teeth has little, if any, bearing on the form of the mandible, exclusive of the alveolar process.

4. The presence or absence of teeth has little, if any, bearing on the rest position of the mandible, which is always such that the teeth are out of occlusion to a greater or less degree.

5. The rest position of the mandible is a result of a complex muscular coordination existing between the postcervical muscles and those groups lying anteriorly which are concerned with the functions of mastication, respiration, deglutition and speech. Acting as a unit, they contribute to the balanced posture of the head.

6. The proportions of any face, as far as vertical height is concerned, are constant throughout life.

7. The mean nasal height is 43 per cent.

8. The Costen syndrome is not the result of a new position assumed by the mandible through loss of dental height, but rather is induced by overclosure of a mandible in function. It can be more logically explained on the basis of neuromuscular than on the basis of mechanical conditions.

9. If the mandible is carried, by artificial restorations, to a position beyond that of physiologic rest, it will return to its preordained position through an accommodation of the alveolar process or a depression of the abutment teeth.

BIBLIOGRAPHY

BRASH, J. C.: Growth of Jaws and Palate. Dental Board of the United Kingdom, 1924.

BRODIE, A. G.: Biologic Aspects of Orthodontia, in Dental Science and Dental Art. Philadelphia: Lea and Febiger, 1938.

Idem: Some Recent Observations on Growth of Mandible. *Angle Orthodontist,* 10:63, April 1940.

Growth Pattern of Human Head from Third Month to Eighth Year of Life. *Am. J. Anat.,* 68:209, March 1941.

BROADBENT, B. H.: New X-Ray Technique and Its Application to Orthodontia. *Angle Orthodontist,* 1:45-66, January 1931.

COSTEN, J. B.: Glossodynia: Reflex Irritation from Mandibular Joint as the Principal Etiologic Factor. *Arch. Otolaryng.,* 22:554-564, November 1935.

DENNY-BROWN, D.: Selected Writings of Sir Charles Sherrington. New York: Paul B. Hoeber, Inc., 1940.

GILLIS, R. R.: Establishing Vertical Dimension in Full Denture Construction. J.A.D.A., 28:430-435, March 1941.

HARRIS, H. L.: Effect of Loss of Vertical Dimension on Anatomic Structures of Head and Neck. J.A.D.A., 25:175-193, February 1938.

HELLMAN, MILO: Preliminary Study in Development as It Affects Human Face. *D. Cosmos,* 69:250-269, March 1927.

HIGHT, F. M.: Taking of Registrations for Securing Centric Jaw Relation. J.A.D.A., 23: 1447-1450, August 1936.

KLATSKY, MYER: Physiology of Mastication. (Moving picture made under the auspices of Medical Department, Workmen's Circle, New York City.)

MERSHON, J. V.: Possibilities and Limitations in Treatment of Closed Bites. *Internat. Orthodontia,* 23:581-599, June 1937.

NISWONGER, M. E.: The Rest Position of the Mandible and the Centric Relation. J.A.D.A., 21:1572-1582, September 1934.

ROGERS, W. M., and APPLEBAUM, EDMUND: Changes in Mandible Following Closure of Bite with Particular Reference to Edentulous Patients. J.A.D.A., 28:1573-1585, October 1941.

TENCH, R. W.: Dangers in Dental Reconstruction Involving Increase of Vertical Dimension of Lower Third of Human Face. J.A.D.A., 25:566-570, April 1938.

THOMPSON, J. R.: Cephalometric Study of Movements of Mandible. J.A.D.A., 28:750-761, May 1941.

Roentgenographic Investigation of Opening Movement of Mandible. Unpublished data.

OSTEOMA OF THE MANDIBLE: REPORT OF A MASSIVE TUMOR

By Raymond S. Rosedale, M.D., M.Sc. (Med.), and
Wesley B. Hargraves, D.D.S., Canton, Ohio

THERE is relatively little in the literature regarding osteoma of the mandible. Perusal of the Cumulative Index reveals few papers. Therefore, this unusual case, with a general discussion of the subject, is presented.

In referring to the benign tumors of the mandible proper, one can define some of the general connective tissue tumors: osteoma, osteofibroma, chondroma, myxoma, etc. Connective tissue tumors and those of epithelial origin should not be confused. Histogenetically, primary tumors of the mandible proper are all of connective tissue origin.

In a paper by Spencer, Hegner and Black,[1] epithelial tumors and cysts are grouped together. From the point of view of pathology, a distinction should be made in the consideration of tumors of the mandible.

Phemister and Grimson[2] pointed out that most ossifying tumors of the jaw do not contain cartilage because they come from membranous bone. These writers divided benign connective tissue tumors of the jaw into two groups, osteofibroma and fibrous osteoma, the distinction being made in accordance with the predominating tissue element. They believe that osteoma of the membranous bones is infrequent and that most osteomata of the skull occur in the cranial vault or in the nasal sinuses. In their search of the literature, they found no cases of benign tumor of the jaws which underwent malignant transformation. In regard to the microscopic structure in the seven cases which they reported, they noted mosaic patterns of bone and fibrous spaces. No cysts or giant cells were present. In their cases in which the blood chemistry findings were reported, the blood calcium and serum phosphorus were normal.

Eden,[3] in a rather comprehensive review of the subject of benign fibro-osseous tumors of the skull and facial bones, divided localized fibrous osteoma into two different types: (1) the fibrous spongy tumor involving the whole bone and (2) the hard button-like swelling on the surface of bone, which he referred to as compact osteoma. He stated that osteoma occurs as commonly in one sex as in the other. It is sometimes multiple, but is most often single. It is slow-growing and painless and causes deformity, growing along the lines of least resistance. Eden further states that these tumors seldom involve a whole bone. He described the histologic structure of the bone thus:

> The outer surface is covered with a fibrous periosteum overlying a thin shell of cortical bone composed of a fairly mature laminated structure laid down in trabeculae parallel with the surface and separated by a little fibrous tissue. Below this the trabeculae are slender, pass in all directions, and are separated more widely by the fibrous stroma. This bone is less mature, mainly of the woven, blue-staining type, and shows evidence of extensive remodelling where the stroma is originally cellular; bone formation is active and occasionally calcium spheroids are present. In other areas where the cells are fewer and the fibres coarser and more plentiful, bone formation is less active and wide tracts of fibrous tissue devoid of ossification are found. At the base the tumor passes indefinitely to a variable depth into the normal cancellous bone beneath. It ap-

pears, therefore, that these tumors are usually subperiosteal in origin.

In the latest edition of "Oral Pathology," Thoma[4] describes osteoma durum, with compact bone in the center, and osteoma spongiosum, with central spongy bone. It is stated that osteomata arise from the periosteum and that they may have a wide base and be of such size as to interfere with chewing, breathing and swallowing. A case is described by Thoma in which the tumor, occurring on the inner aspect of the jaw, occluded half of the pharynx. It was treated by removal of the tumor, with part of the cortex and the mandible. Histologically, the tumor was composed of compact bone. It was Thoma's opinion that intraosseous and osseous tumors occur in both jaws, but

Appearance of mouth, showing part of tumor. The tongue is atrophied, with displacement to the right.

are considerably rarer than tumors of periosteal origin.

Paget,[5] in his discussion of benign tumors of the jaws, stated that the distinction between inflammatory and neoplastic diseases of bone is difficult and that a final opinion should be based chiefly on gross examination. We believe that although there is a good basis for this statement, the final opinion regarding the diagnosis should rest on careful study not only of the gross findings, but also of the roentgen ray pattern, the microscopic structure and the history of the disease.

Vilray P. Blair[6] described osteoma of the jaws as more common in the upper than in the lower jaw. He stated that it may be pedunculated or may have a broad base, and that it is painless except as it may cause pressure upon the surrounding structures.

S. S. Schenk,[7] in discussing tumors of the mandible, states that they are composed of fibrous tissue, bone and some cartilage. We are of the opinion that true cartilage is not found in ossifying fibroma. He also stated that in the x-ray pattern, there is coarse mottling and no sharp trabeculation, although the tumor had a distinct contour.

Ewing,[8] in his latest edition of "Neoplastic Diseases," points out that histologic study may fail to distinguish between hyperplastic processes and tumors. This is somewhat in line with Thoma's opinion. It is believed by Ewing that osteoma may be spontaneous or traumatic in origin but that it never results from inflammation. No specific reference was made to osteoma of the mandible, but in his general discussion of osteoma, he stated that the quantitative number of osteoblasts was one of the important factors in distinguishing between a true tumor and an inflammatory process.

In regard to treatment of osteoma of the mandible, only one reference regarding x-ray therapy was noted in the literature. This was by Phemister and Grimson,[2] who state that in two of their cases, x-ray therapy slowed the growth of the unremoved portion of the tumor for a long time. Schenk[7] states that the more spongy forms of tumors could be chiseled from their base without likelihood of recurrence. We believe that the osteofibroma and fibrous osteoma of periosteal origin should be removed by laying back soft tissue flaps with wide enough bases to insure their survival, and the tumor should then be removed by means of gouges, the normal contour of the mandible being restored.

It is obvious that surgical measures are

indicated only when the tumor is of sufficient size to cause pressure, or it interferes with deglutition, respiration, movement of the tongue or speech, or when the removal is necessary to facilitate fitting of dentures.

There are several choices of anesthesia. Intravenous sodium pentothal has the advantage of leaving the oral cavity unencumbered by the presence of the anesthetizing apparatus. Intratracheal nitrous oxide-oxygen anesthesia, with the tube introduced along the floor of the nose, has the advantage of a dry airway when the pharynx has been properly packed with gauze around the tube. Either of these methods would seem preferable to block or open ether anesthesia. If carious teeth are present; or if there is a moderately severe gingivitis, or if there is obvious infection of the tonsils, it should be remedied before the tumor is removed.

During the operation, bleeding is controlled by the application of adrenalin packs, or if spurting of blood vessels is encountered in the bony structure, it may be controlled by the close apposition of bone wax. In closure of the flaps, the contact should not be so close as to prevent proper drainage.

Postoperatively, the use of alkalinizing and oxygenating mouthwashes is important. During the first twenty-four hours, the fluid balance can be maintained by the parenteral administration of fluids. It is wise to administer the proper sulphonamides preoperatively, and to use 1.5 gm. of neoarsphenamine in 10 per cent glucose in normal saline solution postoperatively.

We are reporting herewith a case of fibrous osteoma of the mandible not only because such reports are rather scarce, but also because the tumor in our case was very large.

REPORT OF CASE

History.—J.D.W., a colored man, aged 58, referred by Dr. M. B. Williams, January 2, 1941, to one of us (R. S. R.), gave a history of swelling on the lingual aspect of the left side of the mandible (Fig. 1) known to have been present for about five years. An unusual observation by the patient was that when he felt cold, the mass would seem to swell and be slightly tender. There had been no ulceration or bleeding. The patient wished to have the mass removed because it interfered with swallowing and speaking, and particularly because it interfered with his playing the trombone. His general health had been good. There had been no loss in weight, strength or appetite.

Examination.—There was a diffuse smooth rounded hard mass on the lingual aspect of the left side of the mandible, extending from the left lateral incisor anteriorly as far posteriorly as the posterior pillar of the left tonsil. Beyond this point, there was a distinct overhang into the pharynx and hypopharynx. The mass occupied a vertical plane extending from the inferior to the superior border of the body of the mandible. There was no other oral nor pharyngeal anomaly. The only other finding of interest in the head and neck was the fact that the jugulodigastric lymph nodes were palpable, but neither tender nor fixed. The tentative impression was that the patient had an osteoma, or a sclerosing type of osteosarcoma.

The patient was referred to one of us (W. B. H.) for an opinion as to whether the two molar teeth which were encompassed by the mass should be removed prior to removal of the tumor proper. The opinion was that the teeth should be left intact.

Operation.—January 23, under avertin and ether vapor anesthesia, administered by Dr. M. B. Williams, the mass was removed. Suitable broad base flaps were turned down and the bony mass was exposed. The outer cortical surface was granular, suggesting the surface of a pomegranate. The outer cortical layer varied from 1 to 2 mm. in thickness. Beneath this, there was spongy moderately firm bone, which was fairly vascular. The tumor was cut away with gouges until the left side of the mandible resembled the right side. The flaps were closed with non absorbent sutures. On the fifth day, one of the flaps was noted to be on the point of sloughing. Cleansing mouth irrigations were used until the twelfth day, when the wound was healed.

Outcome.—Since the operation, the patient has enjoyed good health and there has been no recurrence of the tumor.

Pathology.—The pathologic specimen consisted of about 45 cc. of irregular bony fragments which were blood-stained, spongy and moderately firm. A thin outer layer of bone could be defined over some of these fragments. The surface of the mass was granular. The subjacent structure was irregularly woven together. Microscopically, there was a reticular and cancellous arrangement of osseous tissue possessing a moderate amount of calcium, as evidenced by the intensity of staining. A few osteoblasts were seen near the periphery of the bony strands.

The spaces in this bony matrix were occupied by a loosely woven fibrous matrix, which, in some areas, was so reticular as to resemble a myxomatous structure. Blood vessels were small and few. The diagnosis was osteoma.

BIBLIOGRAPHY

1. SPENCER, F. R.; HEGNER, C. F., and BLACK, W. C.: Benign and Malignant Tumors of Jaw. *Arch. Otolaryng.*, 32:200-245, August 1940.

2. PHEMISTER, D. B., and GRIMSON, K. S.: Fibrous Osteoma of Jaws. *Internat. J. Orthodontia,* 23:919-931, September 1937.

3. EDEN, K. C.: Benign Fibro-Osseous Tumors of Skull and Facial Bones. *Brit. J. Surg.*, 27:323-350, October 1939.

4. THOMA, K. H.: Oral Pathology. St. Louis: C. V. Mosby Co., 1941, p. 980.

5. PADGETT, E. C.: Surgical Diseases of Mouth and Jaws. Philadelphia: W. B. Saunders Co., 1938, p. 692.

6. BLAIR, V. P.: Surgery and Diseases of Mouth and Jaws. St. Louis: C. V. Mosby Co., 1917, p. 430.

7. SCHENCK, S. G.: Tumors of Mandible. *Am. J. Surg.*, 45:253-259, August 1939.

8. EWING, JAMES: Neoplastic Diseases. Philadelphia: W. B. Saunders Co., 1940, p. 216.

ORTHODONTICS AND DENTISTRY IN LATIN AMERICA

By SAMUEL FASTLICHT, D.D.S., Mexico City, Mexico

WE have no precise knowledge as to how far medical science had advanced among the native peoples of America before 1529, but from the Spanish chroniclers and historians who arrived in Mexico in that year, we learn that the Indians of Mexico cured diseases of the gums and teeth with certain medicinal herbs the effects of which were well known to them.

MEXICO

After the conquest of Mexico (1519), the Spanish authorities imposed the first health and sanitation laws, and eight years later, in 1527, the municipal council ordered the organization of the *Protomedicato,* a board to govern the medical professions, giving it an official nature and entrusting to it the task of governing the practice of the medical sciences.

Between the years 1551 and 1553, there arrived from Spain the charter for the first university on the American continent, in Mexico City. In the beginning, the school was devoted exclusively to the pursuit of theological studies, but, before the end of the century, in the year 1580, the first course in medicine had been established.

Also, the first hospital was established in Mexico City, by Hernán Cortés, in the

Read before the Section on Orthodontia at the Eighty-Third Annual Meeting of the American Dental Association, Houston, Texas, October 29, 1941.

year 1524. This hospital must have been a place to wonder at and perhaps even fear, in the minds of the natives.

During the three centuries of Spanish dominion, which constitute the colonial period of Mexico's history (1521-1821), dentistry made almost no progress, the profession remaining at a standstill somewhere between that of the bloodletter and that of the barber.

By the beginning of the nineteenth century, the school of medicine of the national university began to examine the new dentists, the first professional examination being solemnly held July 10, 1841.

It was at this time that the influence of dentists coming from other countries began to be felt. New ideas came in, and the use of false teeth, although still quite primitive, and metal fillings increased. First, French dentists, then English, and later dentists from North America introduced innovations, and, in their clinics, trained dentists.

In 1887, the first dental society, *Sociedad Odontológica Mexicana,* was established.

The dentists who later established the school of dentistry obtained their theoretical knowledge in the school of medicine, but they learned to practice in the private dental clinics of distinguished Mexican and foreign dentists. The certificates issued by these dentists entitled the students to take the professional examination given by the school of medicine, which, in turn, issued their diplomas as dentists.

In the year 1898, the *Sociedad Dental Mexicana* was established through the efforts of Richard Crombé and Carlos A. Young, who, together with some of the best known Mexican dentists, were the initiators of the school of dentistry established in the year 1904, under the name *Consultorio Nacional de Enseñanza Dental,* which continued as a branch of the school of medicine.

Not until the year 1911 did this school become independent of the school of medicine, forming the *Escuela Nacional de Enseñanza Dental* (National School of Dental Training), which is today the Faculty of Dentistry of the National University of Mexico.

There are five schools of dentistry in the Republic of Mexico: 1. The School of Dentistry of the National University of Mexico, at Mexico City. 2. The School of Dentistry of the University of Jalisco, at Guadalajara. 3. The School of Dentistry of the University of Puebla, at Puebla. 4. The School of Dentistry, Monterrey, Nuevo León. 5. The School of Dentistry, University of Sureste, Mérida, Yucatan.

The first of these is the most important, having at present an enrollment of 400 students and sixty professors. In accordance with the new plan of studies approved in 1940, the course of study for a dental surgeon degree requires completion of two years of specialized premedical courses and five years of study in the college of dentistry. This school, headed by an alert and competent faculty, is possessed with a great desire for scientific improvement, a constant effort being made to improve the curriculum.

The School of Dentistry of the University of Jalisco, in Guadalajara, requires for enrollment the secondary school certificate, and the specialized premedical course. The curriculum in the school of dentistry covers three years of study and six months of practice prior to the professional examination. The average number of pupils is thirty and the total number of graduates is around 100.

Dentistry in Mexico keeps up with the rhythm of scientific progress of the world. The government of the republic has recognized the importance of public dental hygiene, and the health department maintains a large number of free dental clinics for the underprivileged classes, as well as for government employes.

It is estimated that in the Republic of

Mexico there are approximately 1,600 dentists, of whom 800 are in Mexico City.

Orthodontics is at present the most flourishing branch of dental practice. The growing understanding of orthodontics by the public moved an enthusiastic group of orthodontists to organize the Mexican Orthodontic Society, *Asociación Mexicana de Ortodoncia.* A constant interchange with North American orthodontists has resulted in the introduction of the most modern technic in practice in Mexico.

We are indebted to the liberal spirit of Spencer R. Atkinson, honorary president of the Mexican Association of Orthodontics, for bringing to Mexico periodically orthodontists of prestige from the United States, who have shared their scientific knowledge, research and experience in certain technics with Mexican orthodontists.

The *Asociación Mexicana de Ortodoncia* has organized three medicodental conventions in recent years, with the cooperation of Mexican dentists and physicians and of physicians, dentists and orthodontists from the United States. The results of these conventions have been excellent, not only from the scientific point of view, but also from that of the social relations established, which contribute directly to the growth of fraternity between both countries.

Orthodontics is taught in the school of dentistry in the fourth and fifth years.

The leading dental associations in Mexico are: 1. *Federación Dental Nacional Mexicana.* 2. *Consejo Nacional Mexicano de la Federación Odontológica Latino Americana (F. O. L. A.)* 3. *Asociación Mexicana de Ortodoncia.* 4. *Sindicato de Cirujanos Dentistas de la República Mexicana.* 5. *Asociación Mexicana de Cirujanos Dentistas Militares.* 6. *Asociación de Cirujanos Dentistas de la Asistencia Social.*

The periodicals are (1) *Boletín Odontológico Mexicano;* (2) *Revista Odontológica de México,* and (3) *Noticiario Dental.*

GUATEMALA

Guatemala, though a small country, possesses a fine school of dentistry and there is a high professional standard among its dentists.

The school of dentistry is equipped with up-to-date laboratories, its clinic having fifteen dental units. Its curriculum, with the requisite of one year of predental study, covers five years.

The school has at present a faculty of twenty-four and a student body of thirty. Formerly, the school was a branch of the school of medicine, but, in April 1940, it was raised to the category of a faculty of dentistry of the national university.

Orthodontics is taught in the fifth year. No dentist is engaged exclusively in the practice of orthodontics, but there are several who are successfully engaged in this branch. At present, there are approximately ninety dentists in the republic, sixty of whom practice in the capital.

Eduardo Cáceres published a *Historia de la Odontología de Guatemala* in 1938, which has been praised by the professional publications in Spanish American countries.

The most important society is the *Sociedad Dental de Guatemala.* There is also a National Council of the *Federación Odontológica Latino Americana (F. O. L. A.).*

SALVADOR

The small Republic of Salvador, with only 1,800,000 inhabitants, is one of the most advanced countries in Central America. San Salvador, the capital, has a very modern school of dentistry with a fine faculty. According to the latest curriculum (1940), five years is required for the course of studies in the School of Dentistry of the University of Salvador. The high standards of dentists in Salvador are reflected in their professional life

and in the progress of the general culture of this Central American country.

Orthodontics is little practiced, but there is keen interest in the development of this specialty.

The societies are *Sociedad Dental de El Salvador* and *Consejo Nacional de la F. O. L. A.*

The *Revista Dental* is the organ of the *Sociedad Dental de El Salvador.*

HONDURAS

In Honduras, most dentists are graduates of schools outside the country; that is, in the United States, Mexico, Guatemala and Salvador. Properly speaking, there is no school of dentistry, for the school, which is part of the school of medicine, only organizes juries to examine and revalidate studies of dentists who take their courses elsewhere.

There are approximately sixty dentists, the majority of whom practice their profession in the region called Costa Norte. Very little orthodontics is practiced in Honduras.

The societies are: *Asociación Dental Hondureña, Consejo Nacional de la F. O. L. A.* and *Colegio Local de la Acadameia Internacional de Odontología.*

NICARAGUA

In Nicaragua, in the city of Granada, there is a school of dentistry, with a course of study requiring four years. There are ninety-two dentists in the country, and two orthodontists in Managua.

COSTA RICA

The University of Costa Rica does not include courses in dentistry. There are approximately fifty dentists practicing in the capital and throughout the country, with one orthodontist, in San José.

PANAMA

While there is no school of dentistry in Panama, a two-year course of predental study is given as preparatory to enrollment in schools of dentistry in the United States. In the Canal Zone, fourteen dentists are in practice, in addition to the dentists in the United States Army. In the City of Panama, there are approximately twenty-five dentists, and three orthodontists.

VENEZUELA

The *Universidad Central,* at Caracas, and the *Universidad de Los Andes,* at Mérida, are the two institutions supported by the state where dentistry is taught. The curriculum requires four years of study for a diploma and one year more is required for the degree of doctor in dentistry. Included among the subjects of the course of study is orthodontics.

There are approximately 250 graduate dentists practicing in Venezuela. The dental profession has not been able to progress as desired because of constant obstruction by the executive council of the school of medicine, which unfortunately holds control over the school of dentistry.

The societies are *Federación Odontológica Venezolana* and *Consejo Nacional Venezolano de la F. O. L. A.*

Venezuela Odontológica is the official organ of the *Federación Odontológica Venezolana.*

COLOMBIA

There are two schools of dentistry in Colombia, one in Bogotá, the capital, which is a part of the national university, and the other in Medellín, Department of Antioquía, a part of the University of Antioquía.

Although courses in dentistry have been given in Colombia since 1888, they are considered officially as starting in 1932, when the School of Dentistry of the national university was founded as a branch of the school of medicine. The course of study requires four years. The number of students has increased steadily. At present, there are eighty-five. To

date, there are eighty-two graduates practicing in the capital and in other towns of Colombia.

This year, on account of its growth, the school of dentistry of the University of Antioquía, at Medellín, was raised to its present status. Its course of study now covers full four years. At present, the school has a student body of sixty.

One of the outstanding figures in the profession in Colombia is Sebastián Carrasquilla.

Orthodontics is taught in both universities, courses for postgraduates also being given. In Bogotá, there are eight orthodontists in practice.

The most important society in Colombia is *Asociación Odontológica Colombiana.* There is also a national council of the F. O. L. A.

ECUADOR

In Ecuador, there are two dental schools, one in Quito, the capital, the other in Guayas.

The School of Dentistry of the Central University in Quito is a section of the school of medicine. Six professors and two assistants give the practical training in different dental subjects, while the rest of the courses are given by doctors from the school of medicine.

The course of study requires five years with one year of special predental study in order to obtain the diploma of dentistry.

The School of Dentistry of the University of Guayaquil has a curriculum that requires only four years of study, and for this reason draws more students than the school at Quito. In 1937-1938, there were twenty-six students enrolled. Orthodontics is given in the third year.

The most important societies are the *Federación Odontológica Ecuatoriana* and the *Consejo Nacional de la F. O. L. A.*

The dental periodical is *Boletín de la Escuela de Odontología.*

BRAZIL

Dentistry came into its own in Brazil in 1933, the year that the School of Dentistry of the University of Río de Janeiro was created.

One of the most important institutions in Brazil is the *Asistencia Dentaria Infantil* (Dental Clinic for Children), which was established in Río de Janeiro in 1925 by Frederico Eyer, and which has since then been under his direction.

In Brazil, there are five schools of dentistry: 1. The National School of Dentistry of the University of Brazil, called the *Instituto Padrao,* at Río de Janeiro. 2. The School of Dentistry, in the State of Bahía. 3. The School of Dentistry at Porto Alegre, State of Río Grande of São Paulo. 4. The School of Dentistry in the capital of the State of São Paulo. 5. The School of Dentistry of Belo Horizonte, capital of the State of Minas Geraes.

Besides these, there are approximately ten private schools of dentistry, under government supervision, which are scattered throughout the country.

The course of study comprises two years of special predental studies, and three years for the dental course. Orthodontics is given in the third year.

The societies are *Federación Odontológica Brasileira, Consejo Nacional de la F. O. L. A., Asociación Paulista de Cirujanos Dentistas* and many others.

The periodicals are: *Brasil Odontológico, Revista Odontológica brasilera, Revista de Pharmacia e Odontologia, Archivos Riograndenses de Odontologia, A Odontologia Moderna, Bahía Odontológica, Gazeta Odontológica* and *Boletín Odontológico Paulista.*

Dental studies and activities have reached a high development in Brazil.

PERU

In 1868, a section on dentistry was established within the school of medicine at Lima. The course of study cov-

ered two years. As there was no dental clinic, students obtained their training by working in the clinic of a dentist, who would issue a certificate of competency and good conduct.

Since 1935, the school of dentistry together with the school of medicine and pharmacy has made up the school of medical sciences of the university. The course of study requires five years: the first year, a preparatory prerequisite in biologic sciences, and four years in the school of dentistry.

Orthodontics is taught in the third and fourth years, together with pedodontia. The practice of orthodontics is just beginning. There are no specialists, but there is a small and enthusiastic group of those eager to develop further the science and practice of orthodontics.

Academia de Estomatología del Peru, founded in 1929, carries on a significant scientific and social work. Its president, a man of international prestige, is Ricardo Salazar.

The bulletin *Escuela de Odontolgía* is the dental medium of publication.

BOLIVIA

There are three dental schools in Bolivia, at La Paz, Sucre and Cochabamba. The first named was founded in 1910, and the two others were opened in 1930, when university autonomy was established.

The School of Dentistry at La Paz was the first school of dentistry in the country.

The new course of study calls for five years with completion of secondary school as a prerequisite. The first two years are considered premedical, the three others comprise the professional studies. There are at present ninety-five students at the Dental School in La Paz. The schools at Cochabamba and Sucre have curriculums which call for five university courses and do not have premedical studies. Students completing secondary school enter the first of the five university courses.

There are 305 dentists practicing within the territory of Bolivia. There are remote towns without a dental surgeon. On the other hand, the concentration of dentists in the cities is beginning to create a serious problem.

Orthodontics has a very limited practice.

The dental societies are *Sociedad Odontológica de Bolivia* and *Consejo Nacional de la F. O. L. A.*

The *Bolivia Odontológica* is a quarterly review.

CHILE

In Santiago de Chile, there are two dental schools, one belonging to the University of Chile and the other to the University of Concepción. The dental school of Chile was started in March 1889 in a room adjoining a hospital. The present curriculum calls for five years of study.

The dental school of the University of Concepción was established in the year 1919.

There are approximately 1,200 dentists in Chile.

The orthodontics clinic of the School of Dentistry of the University of Chile was created ten years ago. Owing to the initiative of A. Manhood, the course in orthodontics was established. It is now taught in the fourth and fifth years, in accordance with a recent change in the curriculum, and is given by Arturo Toriello and Rafael Hunneuus Guzmán.

In Santiago, there are ten dentists practicing orthodontics, two of whom practice it exclusively.

The *Sociedad Odontológica de Chile, Asociación Odontológica de Chile, Centro Odontológico Germán Valenzuela Basterrica, A. R. P. A. Nacional* and National Council of the F. O. L. A. are the dental societies.

Revista Dental de Chile and *Boletin*

de la Asociación Odontológica de Chile are dental periodicals.

PARAGUAY

The school of dentistry of Paraguay, which is part of the national university, is located in Asunción, the capital. It was officially inaugurated on March 12, 1938. The course of study requires five years, preceded by a year of predental study. Orthodontics is given in the fourth and fifth years.

There are fifty-five dentists practicing throughout the country. All are graduates of European and American universities. Two of them are engaged exclusively in the practice of orthodontics.

The review is *C. E. O. Asunción.*

URUGUAY

The small republic of Uruguay with 2,000,000 inhabitants holds a prominent place among the countries of South America on account of its high degree of culture. This is evidenced by the large number of dentists, 1,100, who practice in Uruguay.

There is only one school of dentistry, in Montevideo. Since 1918, it has enjoyed academic autonomy. The curriculum calls for five years of study, and requires five years of preparatory study.

There are fourteen orthodontists, among whom are men of recognized standing such as Oscar Aldecoa, who, in 1933, published an excellent work in Spanish entitled *Ortodoncia Práctica.* Héctor Damonte is a well-known professor of orthodontics in the school, where the subject is taught in the fourth and fifth years.

In Montevideo, the capital, there are the following professional societies: *Centro de Odontología,* founded in 1910; *Sociedad de Estudios Odontológicos,* with 320 members; *Consejo Nacional Uruguayo de la F. O. L. A.; Sindicato Odontológico del Uruguay* (professional union); *Asociación Odontológica de Paysandú,* and *Centro Odontológico Salteño.*

Publications are numerous and well presented. Outstanding among them is *La Reseña Odontológica,* the official organ of the *Sociedad de Estudios Odontológicos,* which publishes exclusively outstanding original scientific articles. *Centro de Odontología del Uruguay* publishes as its official organ the *Revista Dental,* which is also excellent from the standpoint of contents and presentation. Another of the periodicals is *Defensa Odontológica.*

ARGENTINA

Argentina occupies the first place among the Latin American countries from the standpoint of scientific and social progress, and in view of the research carried on by Argentinian dentists for the advancement of the profession, it leads also because of its institutions such as the School of Medical Sciences, of which the school of dentistry is a part; on account of the exemplary organization of the Municipal Institute of Orthodontics and Dentistry for Children at Buenos Aires, the intelligent studies made by the *Sociedad Argentina de Ortodoncia* and, finally, the excellent dental periodicals and books, to judge by their contents and presentation.

In the Argentine Republic, there are three dental schools, one in Buenos Aires, with approximately 1,000 students; one in Rósario *(Escuela Dental del Litoral),* with about 400 students, and one in Córdoba, with an enrollment of 400 students.

In the Argentine, there are 4,464 dentists, of whom 2,196 work in the capital and 2,268 in the provinces and territorics.

Among the most important dental institutions are: *Federación Odontológica Argentina,* Buenos Aires; *Asociación Odontológica Argentina,* Buenos Aires; *Círculo Odontológico de Rosario,* Rosario

de Santa Fé., and *Federación Odontológica de la Provincia de Buenos Aires,* La Plata.

Numerous periodicals are published in Buenos Aires and other places. Some of them are of a general character, while others are devoted to specialties. The following, among others, are representative of achievement in the field of professional publications: *El Odontólogo* (organ of the Atheneum of the Municipal Institute of Orthodontics and Dentistry for Children); *La Tribuna Odontológica* (organ of several provinces of the republic); *Revista del Circulo Odontológico de Córdoba; Ortodoncia,* biannual organ of the Orthodontic Society of Argentine; *Anales del Instituto Municipal de Odontología; Prótesis; Cirugia Dento-Maxilo-Facial* and *Argentina Odontológica.*

There are two institutions that are outstanding because of the social work that they perform: *Instituto Municipal de Odontologia,* which includes dental services in hospitals, and *Instituto Municipal de Ortodoncia y Odontología Infantil* (Municipal Institute of Orthodontics and Dentistry for Children), which is considered the most important institution of its kind on the American Continent. It was established in 1934 and is supported with municipal funds by the City of Buenos Aires. It was organized by its present director, José Dueñas.

This institution has, among other merits, the following: It begins its services with expectant mothers, to whom it imparts counsel and guidance, and then follows the growth of the child up to the age of 15. The institute has the following sections: diagnosis, odontopediatrics, otorhinolaryngology, orthodontic clinic, dental clinic for children, exodontia, dentomaxillary surgery, x-rays and physiotherapy, laboratory for clinical analysis and anatomopathology, museum, photography and painting, prosthesis and orthodontic laboratory, administration, social service, cultural diffusion and dental prophylaxis.

The child with caries is given a general examination by doctors, and then receives the required dental service. The child suffering from maxillodentofacial anomalies is likewise submitted to examination by the general physician, by the throat specialist and by the endocrinologist. The dentist takes care of the mouth, and finally the orthodontist treats the anomalies. Vitamin deficiency tests are made periodically.

The institute extends its service to children and youth in Buenos Aires. Its services are free for children whose parents have monthly salaries under 250 pesos ($50). Parents with salaries above this amount pay a small fee in accordance with their salary and number of children. No services are given to children whose parents receive salaries above 600 pesos ($120.), to avoid competition with private orthodontists and dentists.

The institute employs the services of 130 dentists and orthodontists, four physicians, twelve dental mechanics and sixty dental assistants.

The institute also trains orthodontists, for it is a center for postgraduate study, with advanced courses in orthodontics.

The Municipal School of Dental Assistants was also founded by José Dueñas. This type of secretary-nurse has been a success indeed.

Orthodontics has reached a high degree of development, as witnessed by the course in orthodontics, created and continued by Juan Ubaldo Carrea, assisted by Armando E. Monti, José Dueñas, Pinochietti and Otaño Antier, at the Faculty of Dentistry.

The *Sociedad Argentina de Ortodoncia,* whose president is Armando E. Monti, has at present more than forty members, several of which are devoted exclusively to the practice of orthodontics. The official organ of the society, *ortodoncia,* replete with important scientific articles dealing with the problems of orthodontics, appears twice a year.

Dr. Monti is the author of an excellent

work entitled *Aparatología Ortodóncica,* recognized for its great usefulness to the Spanish speaking student and professional man. Dr. Monti has recently published another work called *Odontología Infantil.*

CUBA

The most important dental society in Cuba is the *Colegio Estomatológico Nacional,* at Havana. It is officially recognized by the government. Twenty societies located in the most important cities on the island are affiliated with it.

A total of 871 dentists are members of societies. Of these, 532 are in Havana. Besides, there are 200 dentists not members of colleges. There are about 1,000 dentists in the Republic of Cuba.

Within the University of Havana, there is a school of dentistry. Some of the subjects in the curriculum are taken in the school of medicine.

The course of study requires four years. Two courses in orthodontics are given in the third and fourth years by Carlos Coro, dean of the school of dentistry.

Orthodontics has reached a fair development in Cuba. Fifteen dentists practice it, several exclusively.

The societies are *Colegio Estomatológico Nacional* and *Sociedad Odontológica Cubana.*

The periodicals are *El Odontólogo; Cooperación Odontológica; Revista Estomatológica de Cuba; Cuba Odontológica; Revista Dental* and *La Tribuna Odontológica Cubana.*

HAITI

In the year 1898, in the National School of Medicine and Pharmacy, in Haiti, a section was created to teach the art of dentistry. In October 1928, the School of Dental Surgery adopted the course of studies in effect in most schools. The present course of studies calls for one year of predental and four years of professional studies.

The school of dentistry under the able leadership of Jules Thebaud has established, in Port Au Prince, a first-class dental clinic, which enjoys a fine reputation throughout Central America. The school conducts dental hygiene campaigns throughout the country for the purpose of popularizing the practice of dental prophylaxis, especially in the schools. Since 1929, a dental service in schools has been in effect.

There are seventy-two dentists in the Republic of Haiti, of which one is devoted exclusively to orthodontics. In the school of dentistry, orthodontics is taught in the fourth year.

SANTO DOMINGO (DOMINICAN REPUBLIC)

In Santo Domingo, with a population of 1,200,000, is one of the oldest universities of the Continent, called *Universidad de Santo Domingo.* The university includes the school of dental surgery with a three-year course, which may possibly be extended to four.

In the Dominican Republic, there are 300 dentists practicing their profession, among them several specialists in dental surgery, orthodontics and prosthesis.

The dental society is *Consejo Nacional de la F.O.L.A.*

PUERTO RICO

There is no school of dentistry on the island of Puerto Rico. But the university gives the two-year course of predental studies. A dental course is usually taken in the United States.

There are approximately 165 dentists, the majority of whom have graduated from schools in the United States. Others have graduated in Europe. Fifty-four dentists practice in the capital of the country.

Several dentists practice orthodontics, two exclusively, one in San Juan, the capital, the other in Río Piedras.

The dental societies are *Asociación Dental de Puerto Rico* and *Consejo Nacional de la F.O.L.A.*

Odontología is a bimonthly journal.

Recently, thanks to the indefatigability of the leader of the Latin American Dental profession, Juan Ubaldo Carrea, of Buenos Aires, national councils of the *Federación Odontológica Latino Americana* (F.O.L.A.) are being organized in each country.

The F.O.L.A., which was organized October 3, 1917 at a convention that met at Santiago, Chile, initiated the First Latin American Congress, which met in Montevideo in 1920. The Second Latin American Dental Congress met in Buenos Aires in 1925. The Third Congress was held in Río de Janeiro, Brazil, July 14-21, 1929. The Fourth Congress is scheduled to convene in Buenos Aires in 1944.

This is indeed a veritable victory of the central council of the F.O.L.A., at present in Buenos Aires, presided over by Dr. Carrea. It has been able to inspire dentists in Latin America to shake off a certain attitude of indifference and to become organized. This action will tend to strengthen their professional spirit, and to promote Latin American unity, as well as social and scientific interchange.

In recent years, we have observed in the leaders of the dental profession in the United States a sincere desire to establish professional relations with members of the profession in the American countries south of the United States. I recall that several years ago, before war covered our world with blood, the then secretary of the American Society of Orthodontists, Claude R. Wood, advised me of his project to establish contacts between orthodontists of the American Continent, through the organization of a Pan American orthodontic congress. This dream continues alive in the present president of the same American Association of Orthodontists, Dr. Wood, who is to see his dream become a reality, for the Pan American Orthodontics Congress will meet in New Orleans in March 1942.

The directors of the American Dental Association have expressed a desire to have a Pan American day at that convention and, to that end, they have invited the members of the dental societies of Spanish America to attend. Announcement has been made of the trip of the president of the Pan American committee, Daniel F. Lynch, of Washington, to several countries of South America to discuss the problems and plans for the congress. All these plans and efforts deserve our cooperation.

From Argentine to Mexico, there exists the same sentiment of fraternity toward all the American countries. We believe that the time has come to lay the basis for a definite understanding, and for scientific and social cooperation, which will undoubtedly not only benefit our countries in these days of war and anxiety, but also serve as an example of continental friendship in the coming days when peace shall reign in the world. Therefore, I propose that the American Dental Association enter into formal friendly relations with the National Council of the *Federación Odontológica Latino Americana* in each country; and that it study the possibility of the organization of a Pan American dental federation, which shall publish a bilingual (English-Spanish) dental review as its official organ. It is necessary to attack this problem with courage and integrity. The relations must be established on the basis of equality. All neighbors will wish to be treated with the same cordiality. Spanish American countries desire for themselves the same treatment that the North American colleagues grant to those of Canada, for example.

Only in this way will friendship endure and will union be made strong.

PERIODONTAL DISEASES

By Bernhard Gottlieb, M.D., Dallas, Texas

In order to solve a complicated problem, we must be sure that our starting point is correct. The starting point of any pathologic condition is normalcy. The normalcy of the periodontal tissues is fairly well known. We know also that the tooth is in continuous passive and active eruption.

Figure 1 shows two human teeth with an interdental papilla. The depth of the crevice (d) is zero. The level of the cemento-enamel junction (a, b) is different on the two teeth. On one tooth, there is already a downward growth of the epithelium along the cementum, but there is none on the other tooth (c). Such differences can be found between the first and the second molar, on both sides of the second premolar and of the cuspid. Continuous tooth eruption, active as well as passive, is thus illustrated.

The correctness of our starting point having been assured, it is advisable to divide the complicated problem into different parts as far as possible, these parts being much easier to handle than the problem as a whole. At this point, we are confronted with a great danger. If we draw our separating lines in the wrong places and thus mix heterogeneous parts together, we may do so much damage that the solution of the problem is rendered very difficult. The fact that unity of opinion could not be reached in the field of periodontia until now may indicate that some separating lines, in existence or under discussion, are not adequate.

These separating lines must consider histopathology as well as clinical observation. In trying to find the correct separating lines, it may be advisable to investigate the two extremes of the problem. In periodontal disease, we have, on the one extreme, gingival inflammation without pocket formation, even though the condition may have existed for a long time.

We find severe gingivitis, with remarkable loss of epithelium, which means a discharge of pus, yet with no noticeable pocket formation. The main or only symptom remains the gingival inflammation.

The hypertrophic gingivitis seen in puberty and in pregnancy presents no downward growth of the epithelium along the cementum. Pockets, in such cases, are formed by hypertrophy of the gingiva causing an increase in the distance between the gingival margin and the base of the sulcus. In addition, we may find hyperplasia of cementum, apparently in connection with the hypertrophic gingivitis at the cemento-enamel junction, acting as a barrier against the down-growth of the epithelium along the cementum.

Figure 2 shows a hypertrophied gingiva of a patient 19 years old. The higher magnification in Figure 3 shows hypertrophy of the cementum at the cemento-enamel junction, apparently preventing the epithelium from downward growth. Figure 4 shows the lingual gingiva of the same side, which is not

From the Department of Oral Pathology and Dental Research, Baylor University, College of Dentistry.

Read before the Section on Periodontia at the Eighty-Third Annual Meeting of the American Dental Association, Houston, Texas, October 28, 1941.

hypertrophied. Figure 5 shows the area of less severe inflammation in higher magnification and beginning downward growth of the epithelium along the cementum.

Isolated gingival inflammation without corresponding abnormal downward growth of the epithelium along the cementum represents the one extreme of the complicated periodontia problem.

On the other extreme of this problem, we find acceleration of shifting of the epithelial attachment apically.

In the past, we have not seen any connection between denudation and pocket formation, which show the same biologic condition. In both instances, the base of the pocket has moved considerably, apically. In the case of denudation, the gingival margin followed the base correspondingly. Thus no pocket developed. When, for one reason or another, the gingival margin does not follow the base of the pocket, we have pocket formation. In denudation and in pocket formation, the basic biologic condition is the same: accelerated shifting of the base of the pocket apically.

Let us see how little importance may be attached to the reason that failure of the gingival margin follows in some cases.

The most striking reason is topographic. If, for instance, the base of the crevice on one side of an interdental papilla moves far down along the cementum and the base of the crevice on the other side remains at the enamel level, the papilla cannot follow the downward growth of the first crevice. In such a case, a pocket must develop where the base of the crevice moved apically. However, if the neighboring tooth was extracted some time before, the gingival margin can follow the base in its descent toward the apex. We have instead of pocket formation denudation. Figure 6 illustrates this condition.

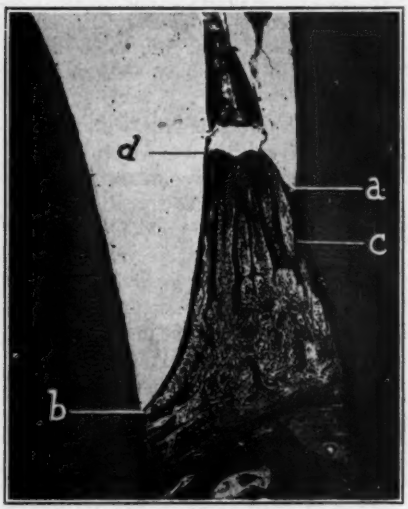


Fig. 1.—Cemento-enamel junction on one tooth (a) which has progressed farther toward occlusal plane than that of other tooth (b). On the first tooth, there is downward growth of the epithelium along the cementum (c). On the left tooth, the end of the epithelial attachment is at the cemento-enamel junction (d). The depth of the crevice is zero.

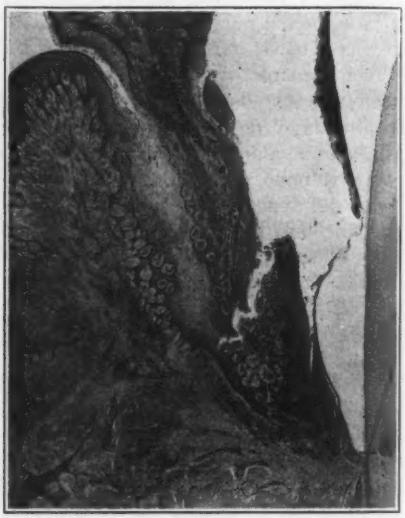


Fig. 2.—Isolated hypertrophic gingivitis on labial side of lateral incisor in 19-year-old patient. a, cemento-enamel junction, labial aspect.

If the same thing happens at the palatal side of a lingual root of an upper molar or at the labial side of a cuspid, the result is in most cases denudation, provided there is no inflammation in such places. If gingival inflammation (non-necrotic) is present, we have hypertrophy of the tissue. Following the gingival margin means atrophy of the soft gingival tissues. Atrophy and hypertrophy cannot occur at the same place at the same time. The gingival margin cannot follow the epithelial attachment In such places, denudation cannot develop, and we always have pocket formation. Figure 7 shows denudation on the palatal root of an upper molar. The higher the gingival margin remains, the deeper the pocket.

Fig. 3.—Higher magnification of cemento-enamel junction in Figure 2. Cementum hyperplasia, at a, offers possibilities of insertion of strong fibers (b). c, end of epithelial attachment.

Thus we are confronted with an entirely different situation from that to which we are accustomed. We are in the habit of thinking of pockets only in terms of inflammation. Here we see the possibility of primary pocket formation. We can imagine that a deeper pocket causes impaired hygienic conditions which result in inflammation. I dare to state that most pockets develop by primary downward growth of the epithelium along the cementum, independently of inflammation, pocket formation without denudation being induced by mere topographic circumstances.

We see that the other extreme of the problem lies in the speed and regularity with which the epithelial attachment is nearing the apex. The many and varying possibilities make the clinical picture of the uniform biologic fact look entirely different. If this rate of speed is present in all teeth and all around every tooth, to the same extent and uncomplicated by gingivitis, we have merely a further ad-

Fig. 4.—Lingual side of the same tooth as in Figure 2. There is no hyperplasia. a, base of crevice. b, cemento-enamel junction.

vanced stage of tooth eruption than we would expect at that particular age. If general gingival inflammation is present at the same time, we see pocket formation and gum inflammation all over the mouth —a condition some people may call pyorrhea.

If the shifting of the base of the pocket along the root surface occurs on different teeth at different rates and even around the same tooth at different places differently, the gingival margin is held at a higher level in the less erupted parts and must develop pockets.

I feel that the nomenclature should

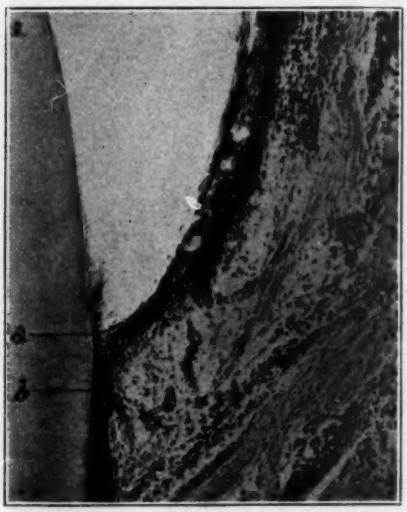


Fig. 5.—Higher magnification of area b, in Figure 4. a, cemento-enamel junction. b, downward growth of epithelium along cementum.

draw a noticeable separating line between gum inflammation and the speed of the shifting of the epithelial attachment apically.

In attempting to analyze the difficult problem of the shifting of the epithelial attachment apically, we must first investigate the local conditions. The teeth represent a hole in the epithelium covering the surface of the body. Wherever there is such a hole, the bordering epithelium tries to close it. It is the main task of the epithelium to protect the connective tissue against contact with the outer world. Closing the tooth hole means loss of the tooth. The epithelium does not seem to be able to grow over the new layer of cementum, which has been deposited in order to fix new periodontal fibers on the tooth surface just opposite

Fig. 6.—a, base of crevice of one tooth. b, base on other side of interdental papilla. The top of the papilla is held at the level and a pocket will develop at b.

the end of the epithelial attachment. Freshly deposited cementum seems to act as a barrier against downward growth of the epithelium along the tooth surface. This apparently is one reason for con-

tinuous deposition of new cementum layers on the surface of the root.

Thus we have analyzed both extremes of our complicated problem. We found, on the one extreme, isolated gingival inflammation without pathologic downward growth of the epithelium. On the other, we found a speeding up of the downward growth of the epithelium without corresponding inflammation. Where we find both symptoms, as we do

Fig. 7.—Upper molar. a, denuded palatal root.

in many cases, we must consider the condition as a combination of two factors.

Analyzing the etiology, we can state that internal secretion is probably, in both cases, an important factor. It is possible that different kinds of disturbances of internal secretions are connected with one or the other extreme. A hot climate seems to favor both. Any ailment may do harm to gingiva and cementum. Therefore, it should be recognized, as a general rule, that every patient who has experienced an ailment should receive treatment of the gingivae. This does not mean, of course, that a patient should get periodontal treatment only if he is able to prove that he has passed through a serious sickness.

If a patient comes to us for consultation about his periodontal condition, it is our duty to look for the causative factor. We have the patient examined thoroughly by a physician, and we are often astonished on receiving an entirely negative report. The negative report is not conclusive at all. The damaging condition may have caused the present situation many years ago and may have disappeared, leaving, say, irregular pockets. At the time of examination, only the pockets may be found, while the condition causing the general trouble disappeared long ago, after operation, from cure or by natural processes. It is possible for us to exercise correct judgment along these lines. If we treat a case of periodontal disease locally, and the response is satisfactory, we can assume that the primary internal cause is no longer active. If a case fails to respond to local treatment, the internal cause is probably still active and we have every reason to look for it.

Sometimes the physician requests that the patient's apparently pyorrheic teeth be removed because they are causing some internal trouble. The dentist may have treated that patient just previously without noticeable success. I would say to this physician: Cure the internal trouble and the bad gum condition will improve.

SILICATE CEMENTS

By WILLIAM A. GARRETT, D.D.S., Atlanta, Ga.

IN a paper entitled "The Place of the Silicates in Dentistry," read before the Ohio State Dental Society in December 1915, Charles C. Voelker stated that he hoped to throw further light on an interesting field and help to do away with the pessimistic impression held by some observers that many dentists were using silicates empirically, and without any exact knowledge of their composition and physical characteristics.

The same condition exists today, just twenty-six years later. It must be admitted that the silicate cements are being used extensively by the dental profession. In a study of these materials by 115 practicing dentists under the direction of the American Dental Association Fellowship at the National Bureau of Standards, and reported by George C. Paffenbarger to the Research Commission of the American Dental Association, it was brought out that approximately 11,000,000 silicate fillings are placed annually. This is roughly an average of 190 per dentist. From such a report, we must conclude that silicate cements are here to stay; their broad use will doubtless continue, and they do have a place in dentistry; *but* we should not use them empirically, as stated by Voelker in 1915.

It would be absurd to blame the weaknesses and failures of the silicates altogether on the materials. Unfortunately, they are considered cheap materials and, next to the silver alloys, are the most abused of the filling materials. Another tragic instance of thinking in terms of materials rather than service.

The apparent simplicity of the technic for their use, and the immediate (not lasting) beauty of the restoration has caused many otherwise careful operators to throw caution to the winds in their use.

The silicates present a far-reaching dental problem, which does not appear near solution. However, much unbiased and conscientious work has been done on the problem within recent years. Much praise is due the Research Commission of the American Dental Association and the scientists at the National Bureau of Standards. Today, there is probably no filling material so widely used about which so little is known.

It is not the purpose of this discussion to consider the chemical composition of the silicates, regarding which I confess complete ignorance, but it is my desire to point out and stress those qualities and conditions that are vital from a clinical standpoint, if silicates are to be used with any assurance of even reasonable success.

Silicates may be defined as a salt or ester of any of the silicic acids. Their complexity and occurrence as isomorphous mixtures render them difficult to classify.

Silicate cement is made by mixing a powder with a liquid, and it is almost impossible to determine by chemical analysis the original products from which silicate powders are synthetized and the proportions in which they are combined. Silicate cement is a highly sensitive chemicomechanical mixture of these powders produced by the action of a

Read before the Section on Operative Dentistry, Materia Medica and Therapeutics at the Eighty-Third Annual Meeting of the American Dental Association, Houston, Texas, October 28, 1941.

strongly acid liquid on these compounds. They represent an incomplete reaction as they are prepared by the manufacturers. This reaction is completed, by the dentist, on the mixing slab, and in the mouth of the patient. The end-results cannot be predicted, for they are never the same. The weakness of these materials is due to the fact that it is impossible to control their variations.

The essential differences between the silicate cements and the zinc phosphate cements are in the powders. Zinc cement powder is composed of modified zinc oxide; silicate powders are complex acid soluble glasses composed of silica and alumina, combined with a variety of other materials known as fluxes. Their exact composition and the method of manufacture are closely guarded trade secrets. Since they are built up synthetically, it is impossible for any one, except the manufacturer, to know their exact composition.

The liquids are aqueous solutions of phosphoric acid ($H_3 PO_4$), which have been partially neutralized by the addition of aluminum or zinc salts, or both. Variations in the materials are such that it seems impossible for the manufacturer to produce powders and liquids to give the same results constantly. Different batches may vary greatly in disintegration, shrinkage and acidity.

There are two reasons for the extensive use of these materials. The primary reason would seem to be esthetic values. The silicate cement gives the most esthetic result, when used in the anterior teeth, of all filling materials known at present, although the result is most often temporary. The second reason is the apparent simplicity of the technic.

M. D. Huff, in "Silicate Cements, Their Use and Abuse," published in THE JOURNAL, June 1935, gave four reasons for failures of these materials to measure up to the ideal: shrinkage while setting, solubility in oral fluids, lack of perfect adaptability to cavity walls and responsibility for death of the pulp. To these should be added discoloration and low strength. They possess little adhesive quality, depending almost entirely on mechanical retention. For retention, they must be bulky, because of friability and low compressive strength. Shrinkage is, of course, one of the most serious shortcomings of the silicates.

The irritation to the pulp by the silicious cements presents a grave problem. There are those who contend that it has no irritating effect, and others believe that it has a destructive effect. This problem cannot be solved by opinion, but there is clinical evidence of many instances of death of the pulp in teeth containing silicate cements. All manufacturers advise the use of a cavity varnish; an admission of the necessity for care in use of silicates. There is every reason to believe that the use of a cavity varnish alone is not sufficient to protect the pulp. The safe procedure in cavities of any depth is to use a lining of zinc phosphate cement. Zinc oxide and thymol, or eugenol, may be used for cavity lining (10 grains of thymol over low heat plus 10 grains of zinc oxide U.S.P.). Hallet advocates the use of one one-thousandth inch platinum or gold foil dipped in varnish and placed against the cavity wall. While all pulp deaths in teeth containing silicates cannot be blamed on the filling material, a sufficient number occur to arouse suspicion.

I wish to show examples of death of the pulp which seems to have resulted from some form of irritation under silicates. Of course, it could be bacterial, resulting from faulty cavity preparation and sterilization. I am showing an equal number of cases with other types of fillings, apparently as close to the pulp as the silicates and which have been giving service for years with no evident injury to the pulp. It is reasonable to assume that no more care was exercised in the cavity preparation, sterilization and in-

sulation of these other fillings than was used with the silicates.

The use of silicates should be confined to Class 3 cavities in anterior teeth and other simple and protected cavities. They should not be used on incisal or occlusal surfaces, because of friability and low compressive strength. The compressive strength of the best silicate is about one half that of high grade amalgam. The silicates should not be used in mouth-breathers.

As previously stated, the silicates represent an incomplete chemical reaction as they are prepared by the manufacturer. The composition of the powder and liquid is under his control. Silicates are designed to give the best results when handled in a definite manner. Exact instructions come with each package, and it is important that these instructions be followed. To obtain the best results, a thorough knowledge of all the factors involved in the completion of this chemical reaction is necessary in order to produce a reasonably good filling. These factors include the mixing technic, or manipulation, humidity, temperature and care of the slab, care of the liquid, etc. The color is affected by the slightest contamination with foreign substances, and all of the factors are under the control of the operator.

The dentist can control the setting time of the phosphate cements by varying the mixing time. This does not materially affect them because they harden by the formation of crystals. The mixing time for the silicates cannot be varied greatly because the cementing agent is largely silicic acid gel. When this gel is formed, it cannot be broken up. Once gelation starts, any disturbance results in a weakened mass.

If the temperature of the slab is between 65 and 75° F., provided the dew point will permit temperatures this low without precipitation of moisture, the time of mixing is from forty-five seconds to one minute and a stiff putty-like consistency is used, the principal difficulty in controlling the setting time will be eliminated. In mixing the cement, care should be taken not to incorporate air. A folding or beating motion should not be used, as air bubbles may result, causing less translucency and greater porosity. There is a definite rise in temperature during setting time. The acidity of the mix is relatively high for the first fifteen minutes.

Eberly introduced the use of soap to neutralize the acid of the silicates. He concluded that the objection to the use of soap was fully recognized, but that the addition of 3 per cent soap made available only 0.23 per cent as soluble salt. For experimental purposes, this provided a satisfactory material of very low acidity. It is evident that it is desirable to reduce the initial high acidity of these cements. It seems that the manufacturers could obtain a better balance in the chemical reaction of the powder and liquid and could introduce neutralizing agents. It is possible that injury to the pulp may occur during this time, especially if the dentin has been drastically dried so that it may absorb some of the liquid portion of the acid unset cement.

Shrinkage takes place rapidly when the cement is exposed to air and continues for long periods of time at a slower rate. Shrinkage is caused by loss of water, and if this loss could be prevented, shrinkage would be greatly decreased, and, under some conditions, expansion might occur. It is not practicable for the operator to control these dimensional changes, nor can the change be predicted, for there are too many variables in the mixing technic: the stability of the liquid, the mixing conditions, the size and shape of the filling, the time of exposure to air before a protective coating is applied, the time that saliva comes in contact with the filling and other conditions impossible to observe.

The silicates are so sensitive to the conditions enumerated that uniform re-

sults are impossible. Clinical observation has shown that none of the silicates are immune to discoloration.

It is essential to use the rubber dam in placing silicates as they are not hydraulic; they will not harden properly under water or saliva, and, if either comes in contact with them before the initial set, they are irreparably damaged. This damage is easily explained, phosphoric acid (H_3PO_4), the major constituent of the liquid, having great affinity for water.

In the experiments conducted by the group of dentists before mentioned, a feature was observed which is most important from a clinical standpoint; that is, the powder: liquid ratio. All of the participants were using 0.4 cc. of liquid as standard, and the amount of powder incorporated in this amount of liquid varied from 1.82 to 0.98 gm. of powder. There is a progressive increase in shrinkage, disintegration and solubility, with a decrease in the powder: liquid ratio. The silicates have inherently low values for these properties, and any manipulation or condition which increases these weaknesses must be constantly avoided.

Humidity is an important consideration, since the liquids gain or lose water in accordance with the humidity of the air to which they are exposed. This is a serious disadvantage, and constant care must be exercised to protect the liquid from exposure. It should never be placed on the slab until everything is in readiness for the mix, and the bottle must be tightly closed at once. Some one has suggested placing a few drops of light liquid petrolatum U.S.P. in the bottle of liquid. The oil spreads in a thin film over the surface and prevents a serious unbalancing of the solution.

SUMMARY

1. Silicates should be used only (a) for temporary restorations; (b) for pits and fissures in protected areas, and (c) in Class 3 cavities in some mouths. They should never be used in mouth breathers, and should not be used in Class 4 cavities because of their low crushing strength.

2. Care should be exercised in cavity preparation. There should be no beveled margins. Cavity varnish should be used in even the smallest cavities, and, in all others, some type of cavity lining should be used. In every instance, the rubber dam should be placed to protect the field of operation from moisture.

3. For mixing, a clean, cool slab should be used. Temperatures from 65° to 75° F. are preferable. The proper amount of powder and liquid is placed on the slab, measured according to the directions of the manufacturer. The mix should be made at once since the liquid will become unbalanced if allowed to stand exposed for any length of time. One minute or less time is preferable. Mixing for a longer time disturbs the gelation and interferes with proper setting.

The cavity should be filled to a slight excess with as little manipulation as possible and the celluloid matrix drawn to place. It should be held for at least three minutes by the watch. Any disturbance during this time will break up the homogeneous mass and result in a weakened restoration.

When the celluloid strip is removed, the filling should be coated immediately with cocoa butter to prevent loss of water from the surface of the filling, and to prevent moisture from coming in contact with the filling. It should then be permitted to set for fifteen minutes, after which it is coated with varnish to protect the surface from moisture until the mass is thoroughly hardened, which requires several hours.

4. The restoration should never be finished at one sitting. Completion should be deferred for at least twenty-four hours. In this time, the filling approaches the maximum hardness. Finishing should be done with cuttlefish disks and strips, or

finishing stones, which should be well lubricated with cocoa butter. Excessive heat in polishing should be avoided as it may dehydrate the material. The finishing is done from the tooth toward the filling. After final setting occurs, silicates must be kept moist at all times. If drying should take place, it is impossible to restore the lost water, and a permanent damage results.

To quote from Black's Operative Dentistry, Vol. II, page 238:

The dentist who has used silicate cements most conscientiously, following the manufacturer's instruction with the greatest care, and has kept accurate records of the necessary replacements due to discolorations of the material, to recurrence of caries on account of shrinkage, or to the washing out of the material with loss of contact of the teeth and resulting gingival irritation and inflammation, has been forced to the opinion that the ideals of practice in the conservation of the teeth and supporting structures demand a rational limitation in the use of silicate cements until decided improvements are made in their physical properties and methods of manipulation.

833 Candler Building.

SURGICAL PROBLEMS INVOLVING THE MANDIBULAR NERVE

By WILTON W. COGSWELL, D.D.S., Colorado Springs, Colo.

TO those who regard the mental and physical welfare of the patient as of paramount importance, the details of prevention of postoperative paresthesia of the lip are of intense interest. To those who realize the professional, and perhaps legal, liability attached to paresthesia cases, any discussion of the subject is interesting. But to those who welcome the condition as obliterative of postoperative pain or who view it merely as a trifling disability, automatically remedied in not more than eleven months, even this brief discussion will be tiresome.

The diagnosis of paresthesia of the lip as indicative of a pathologic or mechanical interference with the third branch of the fifth nerve is a statement of fact, and with the aid of roentgenographic evidence, determination of the cause is not difficult.

However, a prognosis as to the duration of the symptoms, on which our professional reputation must rest, is but a flimsy structure.

Those of us who are called upon to remedy the ills of the oral cavity by the removal of teeth or the correction of pathologic processes in the mandible are certain eventually to face a postoperative paresthesia. The frequency of its occurrence would indicate the need of a more thorough understanding of anatomic and roentgenographic diagnostic factors leading to a preventive operative procedure.

Permanent postoperative paresthesia would seldom occur and symptoms of shorter duration would be considerably reduced in number if obtainable facts of tooth and mandibular nerve relationship were properly interpreted and the indicated surgical technic was instituted.

The symptoms of mandibular nerve

Read before the Section on Oral Surgery, Exodontia and Anesthesia at the Eighty-Third Annual Meeting of the American Dental Association, Houston, Texas, October 29, 1941.

involvement must be divided into several classes:

1. Transitory numbness the result of constant or intermittent pressure on the soft tissue overlying the mental foramen, usually from a denture over a markedly resorbed dental ridge and mandible.

2. Transitory numbness as the result of surgical procedures in the mental foraminal region, such as incorrectly designed incisions of the buccal soft tissues, for the removal of bicuspid roots, whereby the labial gum tissue, mucobuccal fold and possibly the lip may be affected.

3. Paresthesia of the lip of prolonged duration, the result of a deep bone operation about the mental foramen in which injury to the mental opening occurs, or the opening is entirely obliterated. Several such cases have come to my attention, following the careless removal of bicuspid roots.

4. Paresthesia of the lip following a mandibular injection when the needle has penetrated the nerve sheath, injuring a sufficient number of fibers to cause transitory symptoms.

5. Prolonged paresthesia resulting from grossly incorrect surgical interference for the removal of an impacted third molar, wherein the operator has erred in judgment as to both the initial incision and the operative direction, and has penetrated the lateral throat tissue. These cases result in paresthesia of lip and tongue.

6. Symptomatic paresthesia from extensive pathologic involvement of the mandible, such as cysts, in edentulous areas and about the teeth.

7. Symptomatic paresthesia resulting from unerupted tooth substance located at any point along the mandibular canal between the inferior dental and the mental foramen. These cases nearly always indicate combined pathologic and traumatic nerve involvement.

8. Postoperative paresthesia of the lip the result of surgical interference for the correction of classes 6 and 7 when respect for the integrity of adjacent teeth or bone tissue demands a radical technic, regardless of the mandibular nerve.

9. Complete paresthesia of the lip, resulting from violent external trauma, as in compound comminuted fractures and gunshot wounds of the mandible.

10. A class of paresthesia which constitutes at least 90 per cent of cases, the postoperative condition being the result of surgical procedures involving the mandibular third molar.

Unfortunate though it may be for us, by far the larger percentage of cases of postoperative paresthesia of the lip occur in the third molar region, as the direct result of surgical procedure.

We may be called upon to care for traumatic injuries of the mandible when large sections of the mandibular nerve are exposed or utterly destroyed, or to enucleate extensive cysts involving long sections of the nerve, and find that the duration of the paresthesia of the lip is a matter of days or weeks. We may even sever the nerve; but, with replacement of its segments in approximately normal position, functional regeneration may be expected in a relatively short time. In these cases, we see an extremely rapid anastomotic repair of the peripheral function.

In surgical procedures involving the third molar, any minor injury to nerve fibers may result in permanent paresthesia of the lip, and the complete severance of the nerve virtually invites the condition. The rapid deposition of eburneous bone in the constricted depths of a third molar socket segregates the segments of a severed nerve; and, owing to the inadequacy of anastomotic facilities, functional regeneration may not occur.

In minor cases of nerve injury, the inflammatory processes may produce permanent symptoms by, and accompanying, calcification of the injured segment.

It is a brave soul, indeed, who stakes

his reputation on a postoperative prognosis as to the duration of symptoms.

To the mind of the patient, postoperative paresthesia of the lip is second only in seriousness to surgical fracture of the mandible. Especially is this true if, through incompetence or neglect, the patient has not been forewarned of the possibility of an indefinite continuation of the lip anesthesia.

Diagnostic factors exist by which, through diligent study, accurate knowledge of the relation between the third molar and the mandibular nerve can be obtained. These factors are the anatomic form of the ramus, the relation of the ramus to the body of the mandible and the roentgenographic shadows of tooth and mandibular canal superimposed in the lateral films.

Therefore, diagnosis is divided into two parts:

1. A clinical examination whereby intra-oral palpation of the retromolar area and extra-oral palpation of the lower and posterior border of the ramus determine the lateral divergence of the ramus in relation to the body of the mandible.

The mandibular nerve, unless obstructed by tooth substance or pathologic areas, follows a direct course downward and forward from the inferior dental foramen to the mental foraminal opening. This course does not place the canal beneath the posterior teeth, but well toward the buccal aspect of the third molar area and slightly buccally from the bicuspid root apices.

This is not difficult to understand, provided one visualizes the skeletal structure beneath the soft tissues and recognizes that, in its buccal divergence from the body of the mandible, at the third molar area, the internal plane of the ramus carries the inferior dental foramen a centimeter or more toward the outside of a horizontal line drawn mesiodistally through the occlusal grooves of the posterior teeth which are in normal position in the dental ridge. Were it not for the normal inclination of the molars, which places their root apices buccally from a perpendicular line drawn through the occlusal grooves, the mandibular canal would be a greater distance away buccally than it actually is. Thus, we visualize the mesiodistal path of the mandibular canal.

The depth of the mandibular nerve in the third molar area is controlled by the mesiodistal relation of the anterior border of the ramus to the distal surface of the second molar, which is arbitrarily taken as a point from which to measure.

These positions I have classified in previous papers on the subject of third molar surgical procedures as Classes 1, 2 and 3. Since then, I have realized the importance of these variations in normal structure in their influence on the relation of the mandibular canal to third molar roots. For this reason, I may be pardoned for reviewing these classifications.

Class 1 is the extreme distal relation of the anterior border of the ramus to the distal surface of the second molar, in which the mandibular nerve passes downward and forward to assume its normal level before it passes beneath the third molar area. In this class, only deep tooth substance can contact the canal.

In Class 2, the anterior border of the ramus rises more abruptly from the distal surface of the second molar, bringing the inferior dental foramen farther forward, from whence the canal passes downward and forward across the apical third of a third molar in normal relation to the second molar.

In Class 3, the anterior border of the ramus is in the most advanced position, and rises at the buccal aspect of the second molar, this causing the mandibular canal to cross the normal third molar at its middle third.

Thus, we establish the depth of the canal and its lateral relation to the normal third molar position.

The normal third molar is found

directly distally from the second molar with the occlusal surface of the crown forming a continuation of the normal curve of Spee. In this position, the body of the tooth occupies the distal end of the alveolar dental ridge, and the root apices are well toward the lingual aspect of the mandibular canal.

We find a complicating condition arising from the lateral divergence of the ramus and the marked concavity in the internal surface of the mandible below the mylohyoid ridge. This condition, in conjunction with the lesser curvature of the dental arch in relation to the greater curvature of the body of the mandible, causes in the third molar alveolus a distolingual projection, or what I choose to call a lingual alveolar third molar tuberosity.

A third molar in normal position in the dental arch occupies this tuberosity in its entirety.

A perpendicular third molar from the buccal aspect, whether erupted or not, with a lingual inclination of the crown, will, so far as the crown is concerned, occupy the tuberosity; but its root apices will extend to the buccal aspect and may contact, straddle or cross the mandibular canal.

In a horizontal buccolingual impaction with the occlusal surface nearly always toward the lingual, the molar will, as a rule, clear the mandibular canal. But a horizontal or semihorizontal impacted third molar with its crown distally from the second molar, and within the tuberosity, must assume a position involving divergence of its long axis in the same ratio as the divergence of the mandible and internal oblique line, to remain within bone structure; or it will project its root through the distal wall of the tuberosity into the soft tissues of the lateral throat.

It is here that we see the grossly incorrect third molar surgical procedures, when, through an error in judgment, the initial incision and operative effort to expose the tooth is carried directly distally from the second molar into the throat, injuring the lingual and mandibular nerves, with paresthesia of both lip and tongue.

A horizontal or semihorizontal impacted third molar diverging at the same angle as the ramus will cross the path of the mandibular nerve, and contact with the canal will be contingent on the depth of the nerve. However, we often see the horizontal third molar and the perpendicular third molar assume a position with the crowns at the distobuccal corner of the second molar. This will strengthen the probability of their involvement with the normal path of the mandibular canal.

The combined influence of these variations in anatomic structure gives us a gross clinical picture of the tooth's relation to the mandibular nerve.

2. Roentgenographic findings, which should furnish accurate details of actual contact with the canal.

Intra-oral stereoscopic roentgenograms are unsuccessful and extra-oral stereoscopic films are too greatly distorted and vague as to detail. The intra-oral occlusal film is of no value, because the tooth substance is interposed between the film and the canal. Therefore, we are limited for diagnosis to a lateral film, exposed from the buccolingual aspect, and to similar films exposed with the tube directed more mesially or distally.

The diagnostic factors are contained in the minute roentgenographic definition of the mandibular canal, the periodontal outline of the root or roots and the continuity of the root canals from the pulp chamber to the root apices.

In this discussion, we are interested only in lateral curvatures or projections of the roots.

Our films show all mesial and distal curvatures accurately; but unless there is a lateral projection of the root, irrespective of the degree of mesiodistal curvature, there can be no impingement

beneath the canal. When a true lateral roentgenogram displays the shadow of the tooth superimposed on the shadow of the mandibular nerve, the possibility of partial or complete encirclement of the canal by tooth substance must be ruled out; or a surgical technic designed for such an emergency must be employed.

When a root shadow is superimposed on the shadow of the mandibular canal for no more than one-half its width, there may exist in the root apex or inferior surface a groove through which the nerve may pass, but there can be no encirclement of the nerve below its lateral convexities.

When a root shadow is superimposed across and below the mandibular nerve shadow, there may exist a lateral projection or root curvature beneath the nerve, which will be indicated by the root canal shadow. When there is a break in continuity of the root canal shadow before it reaches the root apex, as denoted by the shadow of the periodontal membrane, there is a lateral curvature of the root.

The point at which the root canal ceases will be a circular black dot surrounded by the circumscribed area of higher calcification indicating the diameter of the root at that point. This anomaly is due to the fact that we have obtained in the roentgenogram an impression of the lateral projection from its foraminal aspect. In other words, we have produced an end view of the curved apical section of the root.

When such a curvature occurs above the superior border of the mandibular canal, it is of surgical interest, but it is not indicative of nerve involvement. When it occurs below the inferior border of the canal, it may project beneath the nerve, and the necessity of a lateral movement of that segment, before it can be safely withdrawn, is apparent.

Roentgenographic evidence of the direction which the lateral projection takes, whether toward the buccal or toward the lingual, must be obtained by exposing another film with the tube approximately three inches distal to the second molar, thus angling the ray forward and inward.

This film will display the length of the lateral root projection and the continuity of the root canal to the root apex. The root will appear to turn forward if the lateral projection is toward the buccal. The root will appear to turn backward if the lateral projection is toward the lingual aspect.

When two or more roots extend below the inferior border of the canal, there is a reasonable possibility that the nerve may pass between them. The divergence of the root canals, from the base of the pulp chamber around the mandibular canal to the end of the root apex, would indicate such a relation.

When two or more canals diverge from the base of the pulp chamber to cross the mandibular canal, at the point of their greatest divergence, and then converge and unite at the root apices below the canal, there is a possibility of complete encirclement of the nerve by fused roots or closely contacting root apices.

When the mandibular nerve passes through tooth substance or through a constricted passage formed by roots, the roentgenographic shadow of the nerve superimposed on the tooth discloses the shadow of the entrance and exit in the form of darkened connecting funnels with a marked constriction of the passageway between, in lesser density. This shadow, of hourglass form, indicates a partial or complete encirclement of the mandibular canal. It indicates a passageway created during the development of the roots, resulting from an effort of the developing tooth substance to exclude the nerve from its path. As the nerve tissue will not tolerate sharp or irritating angles at the entrance and exit of the passageway, they are funnel-like.

These clinical and roentgenographic diagnostic factors, though described only

in basic form, are sufficiently accurate to indicate the surgical procedure necessary for removal of the tooth, and the need of forewarning the patient of a possible postoperative paresthesia. Thus, in brief, we visualize the skeletal structures beneath the soft tissues of the oral cavity.

It would seem obvious, as we are unable safely to displace the mandibular nerve to a lateral position for the release of a projection of tooth substance beneath the canal; and as stretching, compressing or severing the nerve would invite a permanent paresthesia of the lip, the solution of the mechanical problem presented must lie in the mesiodistal division of the tooth, so that the lateral halves of the tooth may be manipulated separately to remove them from their position without injury to the nerve. Such tooth division must create space mesiodistally along the occlusal groove and through the body of the tooth and pulp chamber, with an extension of the divisional space through the root bifurcation area. It must extend no farther.

A chisel will divide the tooth mesiodistally, but a tooth divided in this manner will not necessarily have sufficient mobility of its lateral halves.

The instrument that will best create space within the body of the tooth, and at the same time divide the lateral halves, is the No. 703 crosscut fissure bur.

The divisional cut can be extended to the floor of the pulp chamber, where further diagnostic exploration of the angulation of the root canals will indicate the divergence or angulation of the roots, thus establishing the presence and true position of the bifurcation. To maintain direction, the mesiodistal division should be made at least to the floor of the pulp chamber, before the buccal half of the crown is removed for further accessibility to the bifurcation division.

The division of a single conical root body, with a groove in one of its lateral surfaces, is accomplished by a similar technic, except that the mesiodistal divisional cut must be carried deeper and the tooth divided by a flat blade with rotary pressure.

A tooth roots of which encircle the canal with their apices fused below the inferior border of the nerve can be divided in like manner, so that the lateral halves may be removed without injury to nerve fibers.

I have attempted in this discussion to outline briefly the methods by which, after many unfortunate experiences, I have been taught to visualize the skeletal structure beneath the soft tissues of the oral cavity; and the surgical technic that I have found necessary to avoid postoperative complications.

It must be obvious that I consider the surgical procedure essential to the successful removal of such teeth, involving the mandibular nerve, as requiring a delicacy of technic equivalent to that required in any surgical procedure involving the human tissues.

It would be presumptuous of me to intimate that, by application of the diagnostic and surgical principles set forth in this paper, complete freedom from postoperative paresthesia of the lip can be expected. I have attempted, in my own practice, to face the question fairly, and to admit my surgical blunders which have resulted in such conditions.

By constant observation and study, the occurrence of postoperative paresthesia of the lip has been reduced to an occasional transitory case and rarely, permanent involvement. In my opinion, similar study and operative care will assure the same results for others.

612 Exchange National Bank Building.

UTILIZATION OF VITALLIUM APPLIANCES TO TREAT EDENTULOUS MANDIBLE FRACTURES

By C. M. Logsdon, D.D.S., Hines, Ill.

THE most practical and satisfactory means thus far employed for the treatment of edentulous mandible fractures is the vitallium appliance. Screw posts, sleeves, an alinement bar and a small wire comprise this appliance. The screw posts are 3 mm. in diameter and 2.5 or 3 cm. in length. For a distance of 1 cm., the upper portion of the screw post is round, the remainder being threaded so that it can be screwed into the bone. The tip end of the thread portion of the screw post is slightly smaller than other parts. There is a small hole through the screw post 1 cm. from the base end or upper portion. The sleeves, which are 1 cm. in length, fit over the base end of the screw post. There is a hole through the upper end of the sleeve large enough for a 14-gage bar to pass through. The alinement bar, of 14-gage, is obtainable in both hard and medium tempers, the medium temper being more practical.

A minimum of three screw posts should be utilized in treating a simple fracture, with an additional screw for an additional fracture. With surgical cleanliness and under block anesthesia, screw posts can be placed in position in the mandible by the following procedure. A 1 cm. incision is provided through the mucosa near the center of the alveolar process in the region where the screw post is to be placed. Then a hole about 1.25 cm. in depth is drilled through the alveolar process near the center of the ridge. A No. 10 surgical bur is used to prepare this hole. The screw post is screwed into the hole 1 cm. in depth or deeper. These posts should be placed in position at right angles to the long axis of the mandible and parallel to each other when feasible. If possible they should be placed about 1.5 cm. from the fractures on each side. In the event the screw post is to be inserted in the ramus, it would then have to be placed at a forward and downward incline so that the appliance would not interfere with the maxilla. After all screw posts are placed in position, by manual manipulation the fractured parts are placed in the desired position. The alinement bar is then cut the desired length and bent to fit the case. Then this bar is placed through the hole of each sleeve, one for each screw post.

The alinement bar is then bent at an angle at one end so that it will not pull through the sleeve. The sleeves, with alinement bar attached, are next placed over the screw posts and a 25-gage wire is placed through the holes of each screw post. Then the wire is looped over the alinement bar. The ends of wire are twisted together. After all of these stay wires are tightened, the other end of the alinement bar is bent so that it will not pull through the hole of the sleeve. With these appliances in correct position and the stay wires twisted tightly together, little, if any, adjustment will thereafter be necessary.

Fractures of the edentulous mandible can be immobilized by the method under

From the Dental Clinic, Oral Surgery Section, U. S. Veterans Facility. Published with the permission of the medical director of the Veterans Administration, who assumes no responsibility for the opinions expressed or the conclusion drawn by the author.

discussion until healing ensues and the mandible is free to move. The appliance is not cumbersome. Little discomfort is produced and the oral cavity may be kept sanitary during the procedure. Patients are placed on a well-balanced liquid and semisolid diet while undergoing treatment.

One not familiar with the bone changes, which, more often than not, will occur while these screw posts are in position in the mandible, may at first be somewhat disappointed, since pressure necrosis may occur in the bone around the screw posts. The greater the pull on the screw posts, the more extensive the necrosis, which may be seen in the roentgenogram from three to four weeks after the appliances are placed in position, and the screw posts may begin to become slightly loose at this stage.

Fig. 1 (Case 1).—Fracture of mandible (right) before treatment (June 17).

Five case histories of patients recently treated with vitallium appliances are here reported. These appliances were all placed in position under block anesthesia and with surgical cleanliness. The screw posts were removed under block anesthesia after healing of the parts.

REPORT OF CASES

CASE 1.—*History.*—R. S., a white man, aged 50, a salesman, was admitted to Hines Hospital June 17, 1941, for treatment of an injury in the lower right jaw region. The routine examinations were performed and all findings were essentially negative, other than in the jaw region.

Examination.—The patient was well developed and well nourished. He complained of pain and discomfort of the right lower posterior jaw region. There was moderate swelling of the right submaxillary region. The patient stated that he had been slugged on the lower jaw June 14, sustaining the present injury. All teeth other than the lower right and left first molar and the right and left cuspids were missing. There was clinical evidence of a compound fracture of the mandible near the right third molar region with an upward displacement of the posterior fragment. Examination of the roentgenogram of the right mandible revealed a fracture in the third molar region. Two roots were present in the fractured area.

Fig. 2 (Case 1).—Reduction appliance in position (June 19).

Operation.—June 19, this fracture was reduced and fixed. Since the lower cuspid teeth were present, only two screw posts were utilized for the treatment of the case, these teeth being used in fixation of the parts. A screw post was inserted in position to a depth of about 1 cm., also 1 cm. posteriorly from the fracture. Another screw post was placed in position for the same depth and 1 cm. anteriorly from the fracture. The roots were next removed from the fractured area. The posterior fragment was then brought downward, by manual manipulation, as far

as possible. However, because of extensive swelling of the soft structures of the fractured area, this fragment could not easily be placed in exactly normal position. The alinement bar was next prepared to fit the case, and was placed through the holes of two sleeves, the posterior end of the bar being bent at an angle so that the bar would not pull through the hole. The sleeves, with the alinement bar passed through the holes of the sleeves, were placed over the upper end of the screw posts, then bar and sleeves were wired in position. The alinement bar had been so prepared that it extended to the cuspid tooth on the left side. The bar was also wired to the labial surfaces of both cuspid teeth.

Aftercare.—It was necessary to have one-half grain of codeine administered to the patient twice within the twenty-four hours following reduction and fixation of the fracture. Pyramidon, 5 grains, was also administered infrequently during the following week. The oral cavity was irrigated daily with a saturated solution of urea during treatment. Since there was infection of the fractured area, drainage, intra-orally, was instituted beginning June 25, and continuing until an extra-oral incision was provided under the fractured area, under pentothal sodium anesthesia, August 13. This extra-oral incision was 2 cm. in length. The incision was loosely packed with a vaselin gauze drain. The drain was removed every third day and a similar one placed in position, drainage being discontinued August 21. The appliance and screw posts were removed on that date.

Outcome.—There was a bony union, drainage had ceased and movements of the mandible were within normal limits. The patient was free of discomfort in the area at this time. The extra-oral wound soon healed.

Comment.—Three roentgenograms of Case 1 are shown: Figure 1, dated June 17, 1941, before treatment was instituted; Figure 2, June 19, after the appliances were in position, and Figure 3, dated August 18, revealing considerable pressure necrosis involving the screws. Pressure necrosis may be expected around the area of bone where screws are inserted, about three weeks after insertion of these foreign objects, especially necrosis of the mandible, which is more sensitive to foreign objects than are other bones. The more tension on the screw posts, the greater the necrosis.

Fig. 3 (Case 1).—Pressure necrosis involving screws (August 18).

Fig. 4 (Case 2).—Displacement of fractured parts of mandible, before reduction (July 19).

CASE 2.—*History.*—W. H., a white man, aged 47, a carpenter, was admitted to Hines Hospital July 9, 1941, complaining of pain in the lower left jaw. He stated that he had fallen from a bicycle, striking his jaw against a curb the day before admission to hospital. He had no complaints other than of the jaw. Routine examinations were essentially negative other than in the jaw region.

Examination.—The patient was well developed and well nourished. There was moderate swelling of the left submaxillary region. The patient was edentulous and there was clinical evidence of a simple fracture of the left side of the mandible near the junction of the border of the ramus and body, with an upward displacement of the posterior fragment. This diagnosis was substantiated by a roentgenogram of the area.

Operation.—The fracture was reduced and immobilized June 11. Three vitallium screw posts were placed in position in the bone. The posterior screw was placed in bone to a depth of about 1.25 cm., 1.5 cm. distally from the fracture and at a forward angle, so that the appliance would not interfere with the maxilla. Another screw post was placed in position about 2 cm. anteriorly

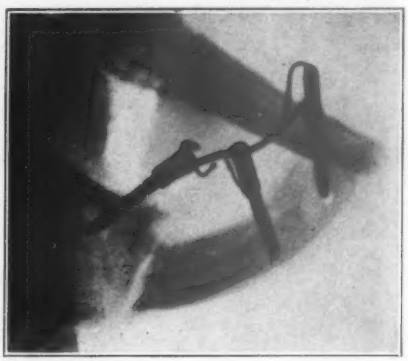


Fig. 5 (Case 2).—Fracture after reduction and fixation (July 12).

from the fracture, and the third one was placed in position about 1.25 cm. anteriorly from the second screw post, each being placed near the center of the ridge and at a depth of 1 cm. The latter two were parallel to each other and at right angles to the long axis of the bone.

The upward displaced posterior fragment was then brought downward by manual manipulation. The alinement bar was prepared and placed through the holes of the sleeves and the sleeves, with the alinement bar in position, were placed over the screw posts. The alinement bar was then well wired in position.

Aftercare.—Cold compresses were applied to the left submaxillary region for the next ten hours to avoid edema, since there was no infection present. Codeine, one-half grain, was administered twice a day for the next two days. Thereafter, pyramidon, 5 grains, was taken occasionally to relieve pain. The oral cavity was irrigated daily with a saturated solution of urea while the appliance was in position. No complications developed. The appliance was removed August 22, the patient being discharged with good alinement of parts and bony union. Also the movements of the mandible were within normal limits. After removal of the screws, new bone formed in areas similarly to formation of bone in a socket following extraction.

Comment.—Three roentgenograms of Case 2 are shown. Figure 4, dated July 9, 1941, shows considerable displacement of the fracture; Figure 5, dated July 12, the condition after reduction and fixation, and Figure 6, dated August 18, good alinement of the fracture and bony union. There is also roentgenographic evidence of pressure necrosis of the bone around the screw posts.

Fig. 6 (Case 2).—Alinement and bony union (August 18).

CASE 3.—*History.*—J. Y., a colored man, a porter, aged 45, was admitted to Hines Hospital July 6, 1941 for treatment of a severe jaw injury and possible other injuries, with a history of being injured when the automobile which he was driving was sideswiped by another automobile July 3. He stated that the passenger occupying the seat beside him was killed instantly in the wreck.

Examination.—The examination, other

than of the jaw region, was essentially negative. However, the patient had suffered severe shock. He was able to abandon the wheel chair about a week after admission. He was well developed and well nourished. He was edentulous and there was extensive bilateral swelling of the submaxillary region. The anterior region of the chin was pushed backward and downward. There was clinical evidence of a compound fracture of the left side of mandible near the second molar region, with the fragments of bone extending through the mucosa. There was also clinical evidence of a similar fracture of the right side of the mandible near the mental foramen region, with the fracture ends extending through the mucosa. Roentgenograms of the right and left mandible substantiated these diagnoses.

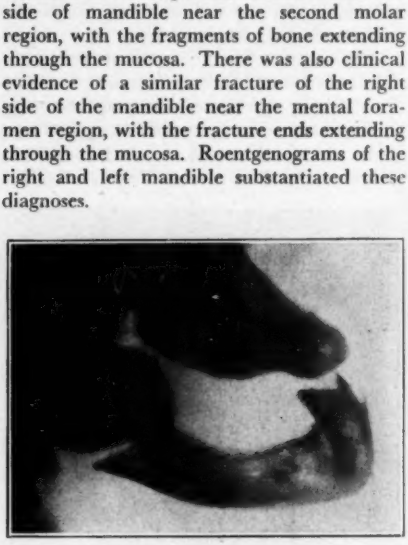


Fig. 7 (Case 3).—Bilateral fractures of mandible with considerable displacement (July 8).

Operation.—July 10, the fractures were reduced and immobilized by the following procedure: four vitallium screw posts were placed in the bone near the center of the alveolar ridge, about 1 cm. deep, each one being inserted about 1.5 cm. posteriorly and anteriorly from the fractures, and parallel to each other. The badly displaced fractured portion was placed in the desired position by manipulation and the alinement bar and sleeves were placed in position and wired securely. Codeine, one-half grain, was administered on an average of twice daily for the next week. Thereafter, pyramidon, 5 grains, was administered occasionally to relieve pain. Since extensive infection of the fractured area was present, free drainage occurred from the fractured areas intra-orally, about five days after reduction of fractures. The oral cavity was irrigated daily with a saturated urea solution while the appliance was in position.

Aftercare.—Localization of the infected areas, bilaterally, was in evidence, extra-orally, July 25. Hot magnesium sulfate compresses were constantly applied to the submaxillary regions for the next four days. July 29, under pentothal sodium anesthesia, an incision was made extra-orally under each fractured area. Each incision was 2 cm. in length and extended to the fractured area. Vaselin gauze drains were loosely placed in the incisions, being changed every third day until August 18, on which date the reduction

Fig. 8 (Case 3).—Appliance in position (July 26).

and fixation appliance was removed, since there was bony union of the fractures.

Outcome.—The intra-oral drainage ceased soon after extra-oral drainage was provided for. Dry dressings were continued over the extra-oral wounds until September 11, at which time, the wounds having healed, the patient was discharged. Movements of the mandible on completion of treatment was within normal limits. Bony union of both fractures was apparent and the facial contour was satisfactory. The face was noticeably disfigured on admission, the fractured portion of the mandible being displaced backward and downward.

Comment.—Three roentgenograms of Case

3 are shown. Figure 7, dated July 8, 1941 reveals fractures, bilateral, of the mandible. Figure 8, dated July 26, shows the reduction and fixation apparatus in position, but the film is distorted or elongated considerably. Figure 9, dated August 18, reveals good alinement and bony union of the fractures.

CASE 4.—*History.*—A. S., a well developed and well nourished white man, aged 48, was admitted to Hines Hospital October 1, 1941, for treatment of injuries to the lower jaw and face region. The patient was non-ambulant on admission and remained so for the next week because of shock. He stated that he had been seriously injured when the automobile which he was driving was hit by another automobile in a head-on collision September 30. He also stated that he had suffered severe pain and discomfort of the lower jaw region since the accident. He had had diabetes since 1937 and had been on a diet and under home treatment for this disease since 1937, but had been steadily employed as a guard during that time.

Fig. 9 (Case 3).—Alinement and bony union following removal of screw post (August 8).

Examination.—The patient was still suffering from diabetes on admission to Hines Hospital. Other routine examinations were essentially negative except in the jaw region. An oral examination revealed extensive swelling of both the right and the left submaxillary regions and of the region of the chin. There was a laceration of the skin near the center of the chin region. The patient was edentulous and had lost his dentures in the accident. The mucosa of the anterior two thirds of the mandible region was badly lacerated, the alveolar ridge of the anterior region of the mandible being exposed. There was clinical evidence of compound, comminuted fractures of the mandible, one fracture being about 2 cm. left of the symphysis and the other in the region of the right mental foramen. The anterior fractured segment was floating and could easily have been lifted from its position, since the mucous membrane covering it was missing. Roentgenograms of the mandible confirmed the diagnosis of fracture and also revealed displacement of several pieces of bone in the injured area, shattered from the mandible. Evidence of early osteomyelitis of the mandible was also revealed in roentgenograms, on oral examination, October 4. The prognosis was guarded at this time.

Fig. 10 (Case 4).—Compound fractures of mandible with considerable displacement (October 6).

Operation.—The fractures were reduced and immobilized October 6, by placing four vitallium screw posts in the mandible, near the center of the alveolar process and about 1 cm. in depth. Two of the screw posts were placed in position about 1.5 cm. apart and 1 cm. distally from the left fracture. Another was placed near the symphysis of the mandible and another in position 1.5 cm. distally from the right fracture. The displaced fracture parts were then placed in position by manual manipulation. The alinement bar was next prepared and placed through the holes of four sleeves. These sleeves were now placed in position over the

ends of the screw posts, and thus the sleeves and alinement bar were securely wired in position. An incision 3 cm. in length was made under the chin, extending to the bone and oral cavity region, the laceration already present being included in the incision.

Aftercare and Outcome.—The oral cavity was irrigated with a saturated solution of sulfathiazole in sodium chloride, and the solution was forced through the wound extra-orally. A 5-grain tablet of sulfathiazole was next placed in the wound in the mouth. A gauze drain immersed in an ointment composed of sulfathiazole 5 per cent and ethyl aminobenzoate 10 per cent was loosely placed in the wound extra-orally and a dry dressing was placed over the area. The gauze drain was removed daily and the sulfathiazole medication mentioned was carried out daily until November 24, when all fracture appliances were removed. There was bony union of the fractures, drainage had ceased and the wounds of the soft structures had almost healed. The ointment gauze drains had been made smaller after the first three weeks. It was necessary to administer one-half grain of codeine every six hours for the twenty-four hours following reduction and fixation of the fractures. Thereafter, pyramidon was administered, in 5 grain doses, on an average of three times a day for the next week and thereafter at bedtime for ten days, after which no drug was necessary to relieve pain. Numerous bone particles were removed, both intra-orally and extra-orally, during treatment of the mandible, which was completed December 2. The case file shows that there was little change in the diabetic condition during this procedure. It is believed that sulfathiazole played a beneficial rôle in this case, since the infective process was kept to what was considered a minimum.

Fig. 11 (Case 4).—Appliance in position November 4).

Comment.—Three roentgenograms of Case 4 are presented. Figure 10, dated October 6, 1941, reveals the fractures and numerous bone fragments, before reduction and fixation of the parts. This roentgenogram is considerably foreshortened in the anterior region, in order to show the mandible on one film. Figure 11, dated November 4, and also foreshortened, shows the appliances in position. Figure 12, dated December 2, reveals the fractured parts in good alinement, with bony union. Also residuals of osteomyelitis are shown.

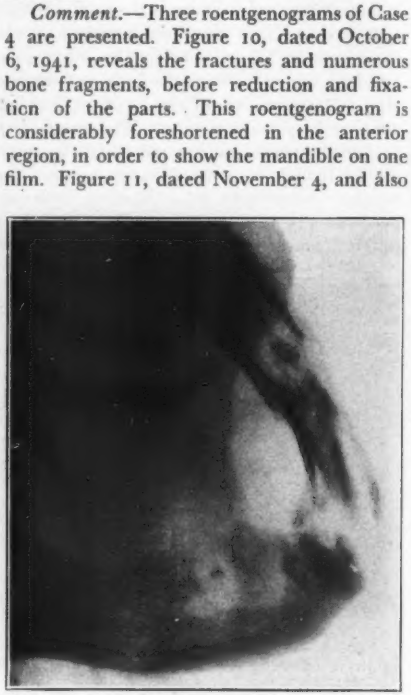


Fig. 12 (Case 4).—Alinement and bony union following removal of appliance (December 2).

CASE 5.—*History.*—A. G., a well developed and well nourished man, aged 43, a machinist, was admitted to Hines Hospital November 10, 1941, for treatment of an injury to the left mandible, which was sustained when he was slugged on the jaw day before admission. The patient was ambulant. He stated that he was in good health and had no physi-

cal complaints other than the jaw injury.

Examination. — Routine examination revealed little of significance except the injury to the mandible. Oral examination revealed moderate swelling of the left submaxillary area, which appeared soon after injury according to the history. The patient was edentulous and there was evidence of a compound fracture of the mandible, about 1 cm. anteriorly from the left mental foramen, the posterior fragment being pulled upward by the muscles of mastication. The mucosa of the fractured region was lacerated. From a roentgenogram of the left side of the mandible, a diagnosis of compound fracture was made.

Operation.—The delay in reduction and fixation of this fracture was occasioned by an uncontrollable situation until November 24. A screw post was placed in the alveolar process of the mandible about 1.5 cm. distally from the fracture. Another screw post was placed in the bone 1.5 cm. anteriorly from the fracture, and a third one was placed in the alveolar process about 1.5 cm. to the right of the symphysis. Each screw post was inserted to a depth of 1 cm. near the center of the alveolar ridge, at right angles to the bone and parallel to each other.

The fracture was then reduced by forcing the posterior fragment downward into the desired position. The alinement bar and sleeves were then wired in position and the fracture was fixed.

Aftercare and Outcome.—The patient was given one-half grain of codeine every six hours for the next two days. Thereafter, one-half grain of this drug was administered at bedtime for the next three days. Pyramidon in 5 grain doses was administered at bedtime for the next ten days. The patient was seen daily in the oral surgery clinic and the mouth was irrigated with a saturated solution of sulfathiazole. Slight drainage occurred from the fracture intra-orally ten days after fixation. December 10, a bone sequestrum about the size of the crown portion of a cuspid tooth was removed intra-orally from the area of fracture, under local anesthesia. Drainage had ceased December 13. The appliance was removed from the mandible December 15, by which time the fracture had healed.

Fig. 13 (Case 5).—Compound fracture of mandible (left) (November 10).

Fig. 14 (Case 5).—Fracture after reduction and fixation (November 24).

Comment. — Three roentgenograms of Case 5 are shown. Figure 13, dated November 10, 1941, reveals a compound fracture of the left mandible before reduction and fixation. Figure 14, taken November 24, shows the fixation appliance in position. Figure 15, dated December 15, 1941, shows good alinement and a bony union of the fractured parts. A vitallium screw post was left in position to show the screw in position, without the sleeve and alinement wire in position. This screw post was removed soon after the roentgenogram was taken.

Approximately 230 patients have been

treated at Hines Hospital for jaw fractures within the past ten years. The average age of these war veterans is 47 years at this time. Therefore, as would be expected, there were several of this group who were edentulous. These edentulous fractures were treated by the utilization of head and chin appliances, open reduction and splinting and by inserting metal posts in the alveolar ridge, the posts being used similarly to teeth in fixing the fracture. More recently, the vitallium appliance has been used for this purpose.

SUMMARY

Five cases of edentulous mandible fractures treated at Hines Hospital by means of the vitallium appliance are reported. Only one of these cases was considered a simple fracture and two cases presented unusual complications owing to the severe injury of the parts caused at the instant of injury.

Fig. 15 (Case 5).—Bony union (December 15). The screw post was removed immediately after the roentgenogram was taken.

These fractures were reduced and fixed under local block anesthesia and with surgical cleanliness. Vitallium screw posts were placed in the alveolar ridge on both sides of the fracture. The fractured parts were placed in position and then the parts were fixed by covering the fracture with an alinement bar, which, with the sleeves, was attached to these screw posts by wiring. The alinement bar was 1 cm. or more above the mucosa of the alveolar ridge. When correctly placed in position, this appliance causes no irritation to soft structures, is not cumbersome, does not produce unsanitary conditions and is practical and efficient for the purpose under discussion. There may be pressure necrosis of bone around the screw posts. The greater the pull, the more extensive this process, which may be demonstrable on the roentgenogram on an average of three weeks after insertion of the appliance. However, this bony change is no contraindication for using the appliance. It is known that the mandible is more sensitive to foreign particles than are other bones. There was bony union in the five cases reported and the average time of fixation was six weeks. Patients were placed on a well-balanced liquid and semisolid diet.

Sulfathiazole was used postoperatively in the most serious injury, and it is believed that the use of this drug was beneficial in minimizing the infectious process of this case.

BIBLIOGRAPHY

1. ADDISON, P. J.: Treatment of Non-Union and Loss of Substance in Fracture of Edentulous Mandible. J.A.D.A., 25:1081-1084, July 1938.

2. ALBEE, F. H.: Treatment of Non-Union with or Without Loss of Bone. *Mil. Surgeon*, 78:413-427, June 1936.

3. AUFDERHEIDE, P. J.: Treatment of Fractures of Maxilla, Mandible and Other Bones of Face. J.A.D.A., 21:950-961, June 1934.

4. BERRY, H. C.: New Departure from Orthodox Methods of Setting Fractured Edentulous Mandibles. J.A.D.A., 28:388-392, March 1941.

5. CAMPBELL, W. C., and SPEED, J. S.: Use of Vitallium as Material for Internal Fixation of Fractures. *Ann Surg.*, 110:119, July 1939.

6. LOGSDON, C. M.: Fractures of Maxillae and Mandible. J.A.D.A., 27:389-392, March 1940.

7. STROCK, A. E.: Method of Treating Edentulous Mandibular Fractures. *Bull. Connecticut D. A.*, 17:17-21, October 1940.

COMPLICATIONS ASSOCIATED WITH THE THIRD MOLAR TEETH

By James R. Cameron, D.D.S., Philadelphia, Pa.

ABNORMAL positions and pathologic changes associated with the third molar teeth are frequently the cause of inflammatory processes within the mouth and associated parts. These morbid conditions may be classified as inherited or acquired. Malposition of the third molar teeth, as with other teeth, is often an inherited tendency and not uncommonly observed. Every dental practitioner sees in his own practice many cases of malposed and impacted third molars, or even third molars in apparently normal position, but having difficulty in erupting.

There are few problems with which the dentist has to concern himself that demand more thought and care than the treatment of a mandibular third molar that is causing trouble. The tooth may be only slightly malposed, but may be irritating the overlying soft tissues to such an extent that the patient will experience considerable pain, especially when eating. Lack of space for the third molar to erupt in normal position may be due to a progressive diminution in size of the jaws, attributable in a measure to the influence of civilization. Failure of teeth to erupt, with impaction in the bone and freedom from contact with other teeth is probably due to some departure from the normal in cell formation at the time of conception and may be inherited.

Abnormal eruption of the third molar teeth may cause only a mild inflammatory process, readily treated by such conservative methods as cleansing the area beneath the irritated gum flap and irrigating it with an antiseptic solution. At times, the gum overlying a partly erupted lower third molar may be irritated by the cusps of a fully erupted upper third molar, and trimming of the cusps becomes necessary to relieve the constant trauma to the gum over the lower tooth. Extraction of the upper tooth may be advisable in some cases to relieve the irritation of the lower gum. When the gum over a partly erupted lower third molar is adherent and swollen and trismus is present or in the process of developing, lancing of the gum with the scalpel or the cold cautery is indicated. The incision should be carried from the anterior margin over the occlusal surface and well beyond the coronal edge of the tooth; otherwise, insufficient drainage from the retromolar area will result. Failure to obtain relief in pericoronitis is often due to an insufficient incision of the gum in an effort to free it from obstructing the inflammatory exudate or pus formed just posteriorly from the tooth crown.

After adequate incision, thorough irrigation of the wound is carried out with a saline solution. The wound is then dried and flooded with tincture of metaphen or tincture of mercresin, and the patient is instructed to use a hot hexylresorcinol solution over the part every hour or so. Daily hot irrigations are carried out, and when the inflammatory process has subsided, the tooth can be extracted if necessary.

Extraction of a lower third molar

Read at the Twenty-Third Annual Meeting of the American Society of Oral Surgeons and Exodontists, Houston, Texas, October 24, 1941.

tooth during acute inflammation of the overlying soft tissues invites complications. Extensive cellulitis of the face, jaws and associated structures of the neck not infrequently follows extraction of the tooth during this stage. Several cases of diffuse toxic cellulitis, involving the face, forehead and scalp, and at times spreading by the venous system of the face into the skull and ending fatally, have been observed. This complication is not so rare as the average dentist may believe.

Recently, in consultation, I examined a semicomatose patient who had had a very stormy ten days following the extraction of a partly erupted lower third molar, and who, at the time of my examination, showed signs of a fatal termination. Edema and induration involved all of the left side of the face, the eyelids, the forehead and the scalp and extended down the neck to the breast. Induration and edema of the back of the neck and occipital region were severe and some areas were fluctuant. The external ear was markedly edematous. Multiple through-and-through incisions, with drainage, were present beneath the mandibular border, in the neck and below the clavicle. The need for further incision and drainage above the breast and in the scapular area was pressing. From all incisions, an extremely foul, putrid-smelling pus drained. Ten days before, the patient, a young woman, was well, with the exception of a troublesome partly erupted lower third molar. The tooth was extracted under local anesthesia during the acute stage of pericoronitis.

Cases like the one just described are not so readily visualized by the average general dental practitioner, who usually sees the patient in the early stage of an infection, but is likely to lose contact with him when severe complications arise. Therefore, it seems necessary that the dentist view all early pericoronitis cases from the bacteriologic as well as the purely surgical aspect. He should constantly bear in mind that the virulent organisms always present in these cases may become extremely active. Overlying gum and gum pockets around partly erupted third molars furnish an excellent lodging place for Vincent's organisms, as well as different strains of the streptococcus and the staphylococcus. Many recurrent cases of Vincent's gingivitis are due to the harboring of these organisms around partly erupted lower third molars, and recurrent Vincent's gingivitis will persist unless the offending third molar teeth are removed. The extraction of these teeth, or of any tooth, should be postponed until all active lesions of Vincent's infection have been brought under control and have been quiescent for about two weeks.

The presence of hypertrophied tonsils, with enlarged and deeply formed crypts usually containing virulent pathogenic organisms, is not infrequently the cause of bacterial invasion of a tooth socket, with resulting complications, such as a rapidly developing cellulitis from three to five days after tooth extraction. The same lymphatics drain the tonsillar area and the third molar region, and undoubtedly a certain percentage of submaxillary abscesses requiring external incision and drainage are due to infection primarily harbored within the tonsillar fossa. Partly erupted lower third molars and infected tonsils must be considered as cesspools of infection, likely to cause a wide variety of toxic bacteriologic disturbances.

In suppurative pericoronitis associated with trismus, cellulitis of the adjacent structures may be well established before the patient seeks relief. If such is the case, a careful examination for areas of fluctuation should be made. A fluctuant area may be found in the buccal vestibule between the second and the third molar. This area is easily approached and the gum can be lanced to free the pus beneath the periosteum. This should be followed by hot antiseptic irrigation of

the part and the patient should be advised to use cold external applications. If the tissues beneath the mandibular border are edematous and tender on palpation, nitrous oxide-oxygen anesthesia may be required in order to open the mouth to permit inspection of the lingual vestibule, where an area of fluctuation is often found just below the mylohyoid ridge. This can be incised and drained. Early incision on the lingual side will often obviate external incision later. When fluctuation is definitely established in the submaxillary area and can be felt externally, external incision is, of course, indicated. Extraction of the tooth is postponed in these cases until the acute symptoms have subsided, which will usually be in about seven to ten days if proper drainage has been obtained.

Removal of the third molar teeth presents problems peculiar to itself, depending upon the position these teeth occupy in the jaw and the type of bone which surrounds the tooth. Probably the most common postoperative complication following extraction of a lower third molar is so-called dry socket. The socket is seldom dry as there is usually foul-smelling semiliquid matter present, and the term, necrotic socket, suggested by Berger, is much more appropriate. While the condition is of a minor nature, it can be, and usually is, a most troublesome and painful aftermath to tooth extraction. Much can be done to prevent this condition by preextraction prophylaxis and careful sterilization immediately before operation of all instruments to be used. The free use of tincture of mecresin beneath and around the gum prior to extraction, with protection of the socket from saliva immediately after extraction, and at least until the blood clot has sealed the socket, will do much to lessen the possibility of a troublesome socket condition. The question whether more cases of necrotic socket follow local anesthesia than general anesthesia is often asked. There was a time when more cases undoubtedly followed local anesthesia, but this is not true today. To my way of thinking, based upon a fairly wide experience, local anesthetic solutions as now supplied by reputable pharmaceutic houses play a very minor part, if any at all, in causing this troublesome condition.

The treatment of dry socket is best carried out in a conservative manner. All necrotic or semiliquefied blood clot is gently washed or removed from the socket with a warm antiseptic solution containing sulfanilamide and allantoin. The socket is then dried and isolated by cotton rolls and flooded with a mixture of iodine and glycerin. This is permitted to remain a few minutes and is then removed by suction. The socket is now dressed with iodoform gauze, in which has been incorporated an analgesic agent of choice. Most of these cases will require treatment for about a week or ten days.

The use of sulfanilamide in a tooth socket immediately after extraction as a precautionary measure against bacteriologic invasion and disintegration of the blood clot has been widely recommended. In my practice, I have not found this procedure so infallible as some advocates state it to be. As far as I have been able to observe, the use of sulfanilamide or any of its derivatives will not do any harm or hinder the healing process of a tooth socket when locally applied, but the amount that can be inserted in a socket is so small that its efficiency is questioned. The drug is not a bacteriocide, but rather bacteriostatic in action and, consequently, requires the use of a much greater quantity than can be inserted in a tooth socket. The internal administration of sulfathiazole for infections in and about the jaws has proved most satisfactory.

Probably among the most frequent sources of infection of an open tooth socket are periodontal lesions throughout the mouth. Pyorrhea alveolaris might be

considered the original "fifth column" group ever to attack man. The number of bacteria in pyorrhea pockets throughout the mouth is enormous, and such bacteria are ever ready to invade a new and fertile field, such as a tooth socket. Three cases of extensive cellulitis of the face, one ending fatally, have recently been observed at the Pennsylvania Hospital. All three resulted from attempts at "self-extraction" of loose pyorrheic teeth. The aim in attempts to prevent or reduce the incidence of bacterial complications following tooth extraction is to clean up gingival lesions prior to extraction.

Complications secondary to removal of third molar teeth are rather common. Fracture of the tooth and inability to remove it, fracture of the jaw, displacement of the upper molar into the maxillary sinus or into the pterygoid fossa or severe sepsis following extraction is not so rare as some dentists think. There is scarcely a day when the oral surgeon is not called upon to take over a "messed up" case—and I mean just that.

There are times when one might ask the question, "Is the oral surgeon an asset or a liability in dentistry?" When the general practitioner continually uses the specialist as some one to help him "out of a jam," oral surgery as a specialty is not an asset to the profession, no matter how highly skilled individual oral surgeons may be. There are certain types of impacted third molars whose removal is not in the field of the general dentist. Before undertaking the responsibility of operating in such cases, the dentist might well ask himself, "How much trouble am I going to cause this patient if I operate? Am I, as a busy dentist, capable of undertaking and successfully finishing what appears to be a difficult surgical procedure?" This might be the line of thought of a general dentist trying to evaluate himself in an honest manner. Probably, the improvement in local anesthesia solutions and the technic of their use has much to do with the many cases of mutilated mouth and jaws seen. The dentist, busy with the many problems of general practice and having a meager knowledge of surgical principles, with little, if any, training in surgery, is not infrequently tempted to go, with the aid of local anesthesia, far beyond his capacity in this field. This is one of the present-day tragedies of our profession. Extraction failures and complications following the extraction of teeth, especially the third molar, are an economic loss to the dentist. It is a wise man who recognizes his limitations.

Tooth extraction should be viewed as a surgical procedure at all times, and especially so when removal of a deeply impacted tooth is being considered. Well-planned and carefully executed operations, having consideration for the structures involved, will materially lessen traumatization of both the hard and the soft tissues. A hurried, unclean, sloppy method or the attempted removal of impacted teeth by operators having little knowledge of the principles involved always leads to complications. Gum flaps properly executed and permitting clear visualization of the overlying bone are most important. Failure to see the bone that obstructs the eruption of the tooth and will obstruct its surgical delivery is one of the most frequent causes of failure in the removal of an impacted tooth. It is the main reason for excessive trauma. Overlying bone which can be seen can be removed by sharp chisels and the tooth can be delivered from its socket with little trauma to either soft or hard tissues. Removal of teeth in this manner does not invite complications and subsequent discomfort. The use of the roentgen rays in preoperative study is almost an absolute necessity. Routine use of the roentgen rays so aids an operator that many difficult operations are simplified, because of a preoperative visualization of what is to be encountered and overcome.

An x-ray film may show the third molar to be impacted, but unless the crown and the entire root are fully shown, a proper interpretation cannot be made. It is sometimes necessary to take several exposures of an impacted molar in order to show the position of the crown in its relationship to the second molar, and also the position that the tooth occupies in the bone; i.e., whether it is lying toward the buccal or the lingual side or is centrally located. The preoperative x-ray study should also show the type of roots, whether straight, fused or curved. The density and thickness of the overlying bone can also be determined in this preliminary study. Because of failure to avail himself of such a preoperative study, the operator may face problems that he did not anticipate and, thereby the difficulties of the operation are increased. This is especially true if proper visualization of the size of the crown and its relationship to the second molar are not considered prior to extraction. If the x-ray study shows the crown to be abnormally large and situated well under the convexity of the second molar, much time can be saved by bisection of the crown. This procedure will also conserve the bone structure inasmuch as less bone will have to be removed and trauma will consequently be lessened. The technic of sectioning the tooth at the dentino-enamel junction or splitting the tooth in its long axis, once mastered, marks a distinct advance in the removal of impacted teeth.

When an unsuccessful attempt has been made to remove an impacted tooth, careful examination of the soft tissue, the bone and second molar should be made before any further operative procedure is undertaken. Not infrequently, such cases have been poorly handled, with resulting laceration of the soft tissues, considerable trauma to the bone and, possibly, fracture of the tooth. That the wound may be infected should not be overlooked. It is my practice, in the majority of these cases, to cleanse the parts, remove all loose spiculae of bone or tooth structure and insert a sedative dressing as often as necessary until the wound has partly or completely healed. The case can then be further studied by x-ray examination and removal undertaken. Unless this procedure is followed, the operator to whom the patient was referred may find himself "holding the bag" because of failure of the first operator, who may possibly have introduced infection into the wound.

Root apices which have fractured and are not readily accessible are, with wisdom, often left *in situ*. Repeated or prolonged attempts to remove a small apex of an upper or lower third molar, especially when it is difficult to see, often results in forcing the root further beyond reach. In the lower jaw, the contents of the mandibular canal may be injured and the root still not be recovered; and, in the upper jaw, a small apex can quite easily be forced into the maxillary sinus. The majority of third molars removed are vital, and leaving a small apex *in situ* is better judgment on the part of the operator than subjecting the patient to possible complications, as not infrequently seen after prolonged attempts at removal with resulting traumatization of the hard and soft tissues.

Many impacted teeth, especially in middle-aged or elderly patients, present considerable difficulty in removal, even for skilled surgeons. Not only should the degree of impaction be given careful thought, but also the temperament and physical condition of the patient should be taken into consideration. With multiple and difficult impactions, we have reduced our difficulties by hospitalizing patients. A well-equipped hospital operating room, properly staffed, with a skilled anesthetist, will simplify to a great extent the problem of removing these teeth. After a little practice, a dentist will find operating on a patient on a table to be considerably less fatiguing

than operating on the patient in the dental chair. In a hospital, difficult impaction cases can be given preliminary study and medication and, what is most important, can have immediate and adequate postoperative care and rest. In addition, the dentist can control the postoperative care of the patient, which he often cannot do in the office operations.

I am convinced that dentists should train themselves in hospital procedure and avail themselves of hospital facilities for the care of difficult impactions, which are seldom minor surgical cases. My experience shows that in difficult impactions, patients make a more comfortable recovery when hospitalized than when operated upon in the office.

19th and Spruce Streets.

DENTISTRY'S OBLIGATION TO SOCIETY—WHAT CAN WE DO?

By L. T. HUNT, D.D.S., Lincoln, Nebr.

GOVERNMENTS are ever changing, even the most stable governments. Forces, for the most part of an economic nature, tend to alter and direct governments as to both form and extent. To cope with the conditions which an economic upheaval creates, a government must adjust itself to these conditions.

It is of the greatest importance to those governed, regardless of the fundamental type of government, that the price of adjustment shall not in the end be a permanent diminution of personal liberty. Governments can be coercive, or they may tend to increase personal liberty. It is, I believe, generally agreed that meeting emergencies tends to restrict personal liberty, and that a true democracy must plan to withdraw whatever restrictions are imposed, once the emergency is past.

This is recognized in the authority given the President in time of war, and it is true if we are to adhere to the belief of our founding fathers who wrote into the preamble of our constitution the following objectives of government: "To form a more perfect union; establish justice; insure domestic tranquility; provide for the common defense; promote the general welfare and secure the blessings of liberty to ourselves and our posterity."

Samuel Joshi, of the University of Bombay, while exchange professor to the University of Nebraska in the early 1920's, stated that, as nearly as he could discern from history, a greater number of people in India than there are in the United States tried our form of government hundreds of years ago, and that it had failed. Our prohibition amendment, adopted in 1918, was pointed to as one which would not stand, and the fifteenth amendment, giving all citizens, regardless of previous conditions of servitude, the right of franchise, was cited as a section of our constitution not complied with in the true spirit of the law. Professor Joshi predicted continued alteration and adjustment of our constitution, declaring us only an infant as a government. His remarks were accepted with tolerance.

The late H. B. Alexander, of the Uni-

Read before the Section on Children's Dentistry and Oral Hygiene of the American Dental Association, 1941.

versity of Nebraska faculty, in answering Professor Joshi, stated that a true democracy of intelligent, informed citizens would grow strong as it was challenged, solving each problem as it arose.

Almost twenty years after that exchange of ideas, we find ourselves today seriously wondering whether Mr. Joshi was correct, and whether a major fundamental change in our government is needed to cope with our problems or whether such a change is in process or has already taken place. Is it not possible that our sensibilities can be numbed by talk about democracy, while the transition to something else is taking place? There are those who believe that some fundamental change is necessary, and that this is a major matter for the people of the nation to decide.

Professor Alexander was depending on an intelligent, informed citizenry to maintain our democracy. Public education was to be our shield, while patriotic devotion and loyalty to those basic principles of liberty through government were to serve as our sword. The idea seemed good, but how is it working out? Frankly, I do not know.

It is significant that, two weeks after one of our major political parties held its convention, only one in four of our citizens claims to have read any portion of that party's platform. Is it a case of specialization when three-fourths of our people believe things so-called political should be left to the politician? Or is it true that a large majority of people have no confidence in any political party or the carrying out of a party platform, whichever party comes to power? Or is it a case of vast numbers becoming indifferent, feeling their franchise of little value, and that no matter what comes, they will carry on somehow? Whatever it may be, the situation is serious.

Over the main entrance to the Nebraska State Capitol are inscribed these words, "The Salvation of the State is Watchfulness in the Citizen." If we regard the state as worth saving, and I am sure we do, we must be watchful, and, to be truly watchful, we must be truthfully informed. We, as a great profession, with more than average opportunity to discern the truth, owe it to society to be watchful, not for ourselves alone, but for all.

The dental profession has been, and is now, ready and willing to cooperate with and assist the government or any branch thereof in establishing and maintaining any program or system of dentistry which will give careful consideration to: first, the needs of the people; second, the obligation to the taxpayers; third, the service to be rendered, and fourth, the interests of the profession. This is dentistry's obligation to society as outlined by the National Health Program Committee of the American Dental Association and approved in principle by the House of Delegates of the Association.

Great strides have been taken by the dental profession to improve standards of practice, to protect the public from those who would abuse the privilege of licensure to practice dentistry and to educate the public as to the true value and need for dental service. Despite these efforts, large numbers of our people, caught in the economic tangle of the times, are not receiving sufficient dental care to make them healthfully secure.

Officials of government have recognized this problem as fundamentally a financial obligation of government. Yet, so far as dental service is concerned, governmental advisers have regarded reasonably complete dental care for those of all ages as too expensive to give it serious consideration. Careful study of bills before Congress discloses meager provision for dental service. In fact, it would be very simple to eliminate dental service under the Capper bill, which is sponsored by the American Association for Social Security and is strictly a health insurance bill.

The late John T. Hanks, of New York City, in 1937, said, concerning a bill

drawn by the same group, "I realized that the proponents of these measures were ready for the sake of expediency to cast overboard many of the people who were most in need of medical and dental service, and that under such circumstances the law would be a half-way measure holding no promise of ultimately solving the most serious part of the problem." In the Capper bill (S. 3660), this group, for expediency, provides, "Dental services for the relief of pain through surgical intervention" and, as in almost all health legislation, the next paragraph sets out that if funds are insufficient to provide all of the regular medical benefits, only part or parts of such benefits may be provided. I relate this to disclose the reason that the dental profession has objected to certain health legislation. Dental care is said to be provided, and dental care as the public thinks of it is not provided. It is our obligation to inform Congress and the public concerning the exact provisions and any shortcomings of all health legislation.

In view of the financial and organizational difficulties incident to providing dental care for all of the people, let us investigate what later plans in other countries provide.

In the dominion of New Zealand, with slightly more than one million people, the department of health controls almost every function demanded of a public health service. The most noteworthy feature of the system concerns the administration of the social security act of 1938, which makes provision for medical and hospital treatment and for "such other benefits as may be necessary to maintain and promote the health and general welfare of the community." The principal classes of benefits provided comprise medical, pharmaceutic, hospital and maternity benefits. Supplementary benefits contemplated include specialist and consultant services; radiologic and laboratory services; home nursing and domestic assistance, and dental service.

Benefits are available to all persons ordinarily resident in New Zealand without regard to race, nationality or economic status, the main object of this legislation being to ensure that, in the treatment of the sick, the economic circumstances of the individual patient will cease to be a consideration, from the point of view of either the patient or those actually rendering service.

A special division of the department undertakes the dental treatment of school children. It is staffed by dental surgeons who are responsible for administration and instruction, and by dental nurses specially trained by the department, who undertake the actual treatment. The work is concentrated on children from 5 to 8 years old. The attendance of children under school age, however, is encouraged.

National Dental Service in Sweden became effective January 1, 1939. Sweden has a population of approximately six million. It is contemplated that a period of ten years will be necessary to establish the system throughout the country. The aim of the plan is that every child of 15 shall have sound teeth. Henceforth, no school will be built in Sweden without a dental clinic.

Although the dental treatment of children of school age is not compulsory, it is estimated that at least 30 per cent of the children from 3 to 6 years of age, and at least 90 per cent of those of school age, will voluntarily avail themselves of treatment.

It is estimated that each dentist will be able to treat an average of 800 children a year (in 1,000 hours). On that basis, it is estimated that about 800 dentists will be required for the complete national organization.

The parents or guardians of the children must pay a fixed annual fee, irrespective of the amount of treatment received, of $1.25 a year for the eldest child, $0.75 for the second child and $0.50 for the third. The fourth and following children in the same family are treated free of charge.

The scale of charges fixed by the medical

board for the treatment of adults is very low. By a resolution of the Riksdag, reduced fees will be charged people of small means for dental treatment. People of no means are treated free of charge, the government and local authorities paying half each of their fees. People of small means receive contributions from the local authorities, who in turn receive a government grant. Such contributions to the cost of dental treatment are not regarded as poor law relief.[1]

Between the ages of 16 and 19 there is no compulsion, but the youth is offered reduced fees as an inducement to continue the work started at school. It is anticipated that the present generation will grow up with sound and healthy teeth, so that as adults they will require only routine care.

The Adult Program takes care of all citizens beyond the age of 19. All are free to seek the services of either the public or private practitioner.

Priority in the public clinics is given to those least able to pay the fees of private practitioners, with the result that most patients financially able to do so continue their patronage of private practitioners. Taxes provide dental care for those unable to pay at all.

The public practitioner receives from $2,000 to $2,250 per year, and it must be remembered that his money has a purchasing power almost double a like amount in the United States; he has a month's vacation every year and is retired at the age of 63 on a pension of $1,350.[2]

In a questionnaire directed to Johan Brun, of Oslo, Norway, in 1936, by the American Dental Association, I find the following questions and answers:

Does your country have governmentally controlled compulsory health insurance?

Ans. Yes, National Health Insurance.

Do the insured receive adequate dental care under these services?

Ans. Yes, limited dental treatment, with extractions done.

Are the insured satisfied with the service?

Ans. There is a strong movement afoot that preventive dental treatment should also be given. The S--met in 1915-17 by law to get the National Health Insurance to accept preservative treatment, but the Norwegian Dental Association considered that dental care was so extensive in Norway that the National Health Insurance could not stand the financial strain, and therefore advised against the law being passed. Instead, the dental association recommended the introduction of State School Dental Care in towns in 1917. School dental care is carried out by municipalities with state support amounting to one-eighth of the dentist's wages. At present an attempt is being made to provide preservative treatment prior to the school age as well as to continue school dental care from 14 years to 20. School dental care is very popular, and although the law provides for children of folk schools in towns only, there are now numerous school dentists in rural districts.

In a review of the various governmental arrangements for the regulation and provision of dental care for its citizens, the Japanese system is found to be outstanding. There the dental societies are "legal identities with judicial powers and shall aim to improve and promote dental affairs in conformity with the provisions of the Imperial Ordinance." Membership in the dental association is mandatory, since it is provided that "dentists shall establish prefectural dental societies in conformity with the provisions of the Imperial Ordinance." A prefecture is a geographic division. It is further provided that "a dentist engaging in dental treatment in a private or public dental office or its branch shall be a member of the prefectural dental society that governs the locality where the office is situated." Fines may be assessed, practices suspended for a certain period or licenses revoked.

Each prefectural society has established four sections to carry on its work: (1) Section of Investigation and Survey; (2) Section of Health Insurance; (3) Section of Public Dental Education, and (4) Section of Scientific Study and Research.

The Japan Dental Association is a combined body of all the prefectural dental societies. Each prefecture elects delegates according to the number of its

members. The management of the association is carried on by a president, two vice-presidents, a chief director and twelve directors, and it is divided into the following four departments:

1. General Affairs Department, which treats all matters not belonging to other departments.

2. Finance Department. Expenditures of the association are defrayed by annual membership fees to be paid by the prefectural dental societies according to the number of their members at yen 1.50 per head.

3. Investigation Department. As a result of investigation, this department has published, or is in the course of publishing, such data as the reports on dental legislation, school dental service and dental register.

4. Dental Administration Department, which carries out matters decided upon by the general meeting, gives advice, directs the prefectural dental societies and negotiates with the government concerning matters of the profession.

Besides these departments, the association has four subordinate boards:

(a) Board of Health Insurance. This board is to fulfil the agreement entered into with the government relative to dental attendance of persons whose health is insured.

(b) Board of Investigation of Dental Legislation. This board is to investigate and report to the association on topics of legislation and other necessary matters relating to the dental profession.

(c) Board of Investigation of Dental Hygiene. This board is to investigate and report to the association on problems of public and school dental hygiene.

(d) Board of Public Dental Education. This, the leading organ of public dental health education, has accomplished, or is in course of accomplishing, work regarding compilation and distribution of data for that purpose, preparation of models for dental hygiene exhibits and movie films, the sending out of lecturers on dental hygiene and the staging of Dental Decay Prevention Day, etc.[3]

It is evident that working agreements between the government and the dental profession under this plan should accomplish great good with a minimum of friction. At any rate, there is created a responsible party, the Japanese Dental Association, which the government respects and treats with. Most significant is the provision encouraging professional research and cooperation in education to promote preventive service.

G. Layton Grier, D.D.S., of Milford, Del., writing in April 1932, after five and one-half months spent in the Orient, the greater part of the time in Japan, says,

> The brief review of the organization of dentistry in Japan shows, I believe, the capacity of the Japanese for coordinating government functions with the organized activities of the people. Should this organizing genius ever be applied to the Chinese nation, the world would have a startling development.[3]

It is noted that all of these countries are small in both area and population when compared with the United States. Their populations, too, are homogeneous, which simplifies the problem. The systems giving complete service to the whole population have not had time to prove themselves.

It would seem that the Swedish system could be worked out in this country in ten years if funds were available and considerate governmental cooperation were assured. It would be difficult to estimate the amount of money needed. It is not yet proved that it will be a simple matter to get a man of means who is a heavy taxpayer to step aside at a public clinic where he has, except for his financial condition, as much right as a man with little or no means. Some of these arrangements which are entirely reasonable in theory and spirit do not work out so well in practice. Moreover,

Sweden could have financial difficulties before this system is fully developed.

New Zealand dental nurses are trained to carry on the operative procedures for children of 5 to 8 years, under supervision. This corresponds to the two-year-dentist system which has been proposed for this country. This means of cheapening and spreading dental service has been objected to by the Committee on Public Health of the American Dental Association (February 1939) and the American Society for the Promotion of Dentistry for Children, whose findings were endorsed by the Committee on Public Health in a resolution to the Board of Trustees, July 1939, as well as opposed by the Board of Trustees of the American Dental Association (February 1939). All of these means to make some sort of dental service available to greater numbers must be carefully scrutinized as part of our obligation to society.

The municipal clinics of Norway do not differ greatly from our school and municipal clinics in this country, except that they are provided for throughout the country and continuously maintained. One of the interesting features of the lack of definite demand for universal public health service in this country is the calm generally displayed when one political group displaces another and, to economize, closes the established dental clinics. This has happened time after time, being carried out by either boards of education or municipal authorities. Another interesting indication is that there is perhaps throughout the country less stress placed on the teaching of health and less preparation of instructors on health subjects than would reasonably be expected in a country interested in health measures. Perhaps one of the greatest needs is to have our culture pattern yield greater dominance to our health problems.

Regarding the Japanese plan, it may be said to be dictatorial or compulsory. However, the lawyers in a few states in this country practice under a system which for the most part is comparable to the Japanese dental system. Every lawyer must be a member of the bar association, and there are various committees of the association with which complaints may be filed by layman clients against lawyers. The conduct of members is passed upon by the state supreme court, and penalties are meted out in accordance with the evidence offered. Certain committees are appointed to revise legal procedures, etc. This is going far to maintain a professional status and public respect.

It is possible that such a plan would be helpful in solving the difficulties of organization incident to setting up a national health program. The medical professions are fearful of placing the amount of service to be rendered and the quality of that service in the hands of lay committees. You will note that the state supreme court, a group of lawyers, was the final resort for control under the Integrated Bar Act (Nebraska, 1939). Lawyers sit in judgment upon lawyers. The Japanese Dental Practice Act establishes each prefectural dental society as a legal entity. Thus, a group of dentists judges and disciplines dentists, and the dental society is in turn directly responsible to the government.

Herbert E. Phillips, of Chicago, stated in my presence that the most troublesome difficulty in a compulsory health insurance scheme was to maintain the morale of the medical professions. This is because of lay or insurance company dictation. It is surely evident that when professional morale is lowered, the needs of the people, the obligation to the taxpayer, the service to be rendered and the interests of the profession are all undermined, and the objective of first-class health service is a lost cause. It has been so in other countries, and it will be so here if such a plan is adopted.

Some one has said, "Forget all these

other plans. Let us evolve an American plan—something which will function effectively." It is an excellent idea, but it should not be carried out by forgetting experiences under other plans. I said that the legal profession had gone far in passing the Integrated Bar Law. Perhaps we are ready, perhaps we must, to solve our problems, make it mandatory that every dentist serve his government and the public through membership in his dental society and thus be made to comply with certain professional rules and regulations. The government would thus give the dental society certain legal powers and furnish funds in exchange for advice, organization and personnel capable of supplying creditable dental service to a larger percentage of the population. This does not seem to be farfetched if both the government and the profession are seriously desirous of providing dental care for larger numbers of our people.

Unless some such relationship is established in good faith, the medical professions, as I see it, have no professional protection or professional status in the eyes of governmental officials. Professional men become pawns or dummies to be praised or maligned, released or regulated, paid reasonably or oppressed in the name of economy. A recent example is the action of the New York City Health Department in changing the status of dentists working as Civil Service employes to that of laborers working at daily hire.

This dental program was set up with the assistance of a dental advisory committee acting in confidence and good faith. John Oppie McCall was chairman. Dr. McCall has this to say about the daily-hire status, concerning which the committee was not consulted:

> I respectfully submit that the change now proposed, if adopted, will inevitably reduce morale in the dental staff of the Health Department with resultant lowering of the quality of dental treatment given. The quality of this service also will be reduced even more in the future, since the Health Department service will fail to attract dentists having the desirable personal and professional qualifications.[4]

Measures similar to this have been taken time after time throughout this country, usually in the name of economy.

Confidence has been undermined, and if this method is used to increase the percentage of the population securing dental care, the plan will be no different here from what it has been elsewhere. Professional morale and confidence are necessary elements in any national health program, and it would be safe to say that any plan which safeguards and maintains professional morale will make it possible for dentistry to fulfil its obligation to society.

BIBLIOGRAPHY

1. KJELLBERG, AXEL: Public Dental Service in Sweden. J.A.D.A., 26:1005-1006, June 1939.

2. McLEAN, D. W.: Editorial. *D. Survey*, 15:1395, December 1939.

3. GRIER, G. L.: Dentistry's Upswing in Japan. *Oral Hyg.*, 22:698, April 1932.

4. McCALL, J. O.: Letter to Comptroller of City of New York; in Ryan, E. J.: Editorial Comment, *Oral Hyg.*, 30:844, July 1940.

504 Security Mutual Building.

THE ORAL MANIFESTATIONS OF SYPHILIS

By THOMAS J. COOK, D.D.S., Philadelphia, Pa.

A RECENT editorial, "The Responsibility of the Dentist in Diagnosing Syphilis," published in THE JOURNAL (February 1941) said:

> The broadening scope of dentistry, with its closer association with diseases that involve the system generally, obligates the dentist to keep well informed on these relations and equipped to do his part in collaborative treatment of oral conditions that are manifestations of systemic disease. Unless he is thus equipped, the dentist is not qualified either in the eyes of the law or in the eyes of the profession to practice dentistry according to the present-day conception of dental practice as a public health service.

This editorial directed my attention to the fact that the man associated with teaching institutions and hospitals has an opportunity to see frequently the oral manifestations of systemic diseases, but the man in private practice does not have this opportunity, and must depend on the literature for information as to the various oral manifestations of syphilis or other systemic diseases which present such lesions.

In the University of Pennsylvania Dental School clinic, where annually thousands of men, women and children, white and colored, apply for treatment, one sees normal mouths and abnormal, and unusual, and occasionally rare, oral conditions. Although many patients come to the clinic for an annual examination, and many of these are children with caries or irregularity of the teeth, or adults seeking denture service, there are others who complain of a "sore" or "swelling," and some are referred for diagnosis by physicians. The majority apply for treatment because of "toothache."

On examination of the mouths of such a large number of patients, one will see a variety of lesions, and the question in the examiner's mind when a lesion is present is this: Is it a local reaction or is it the oral manifestation of a systemic disease?

Many recognized systemic diseases which present oral manifestations at one time or another may be slight or extensive, and may be present in any part of the oral cavity.

While it is not the policy of this clinic to attempt a diagnosis of any systemic disease on oral manifestations alone, the recognition of such lesions warrants further investigation. It is true that, many times, our suspicions have proved to be unfounded; but when they have been confirmed, our efforts have been well repaid.

Syphilis has oral manifestations, the lesions being present early or late in the course of the disease, and the soft tissues, the supporting bone or the teeth themselves may be affected. I know of no other disease of greater importance to the dental profession both from a protective and from a public health point of view, as the following case demonstrates:

> A young woman, aged 23, came to the dental school in February 1940 complaining of a toothache. On examination, it was found that a carious tooth was present in which the pulp was exposed. On the palate was a lesion about the size of a dime which was slightly raised and covered with a gray-

From the Department of Oral Diagnosis, University of Pennsylvania, School of Dentry.

ish membrane. The toothache was relieved, with precautions by the operator against infection, and the patient was questioned regarding the "sore" on the palate. She was not conscious of its presence other than that there had been a "smooth" feeling in the area for about a week. The patient consented to have a blood test and was asked to return in three days. This we knew she would do because the treatment for the toothache was so planned. The serologic reaction was strongly positive (plus 4). The patient was then referred to the University Hospital for examination and treatment. The case was diagnosed as latent syphilis. The social worker learned that the patient had had several recent exposures. She was now serving

Fig. 1.—Chancre of lip. Figures 1-3 illustrate the acute phase.

as a maid and child's nurse and shared a bed with one of the young children of her employer. Treatment was started immediately, and the patient has been reporting to the worker at each visit.

This case demonstrates how syphilis can be spread; how easily the patient might have infected the dentist had an attempt been made to treat or remove the painful tooth without attention to the lesion; how she may have infected the children that were under her care, and how she has probably already infected those persons with whom she has had contact. While this is not the first time that we have seen mucous patches in the mouth of a patient who applied for dental treatment, there was something about this case that impressed the students who saw it, and I am sure that the photographic record and history will serve as a stimulus to future graduates to examine the mouth of every patient thoroughly before any dental operation.

In the discussion that followed a paper read before the American Dental Association in 1925,[1] the following case was cited:

A man came to me complaining of a pain in the lower left jaw, radiating toward the neck. I observed his mouth with a mouth

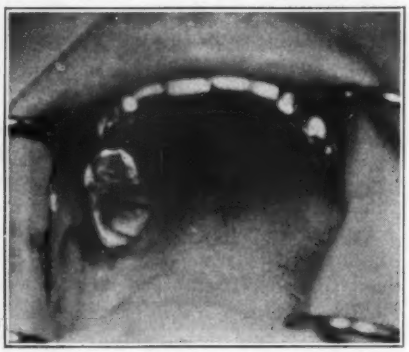


Fig. 2.—Chancre of palate.

mirror, exploring with my fingers to determine whether there was any swelling about the roots of the lower teeth. I could find nothing that would show why the patient had trouble with the lower teeth. I extracted the teeth, fearing that they might be the cause of the pain, because one of the molars had been infected about two months before the patient came in. I could find no reason at all, and I said, "I cannot find anything wrong with your teeth." In talking to the patient, I noticed a little erosion on his lips, no larger than the diameter of a lead pencil. Now and then, as he talked to me, he would lick the area with his tongue, which made it appear somewhat more suspicious. I asked him how this came to be there. He said, "I think it is a fever blister." I asked

him whether he would have a microscopic examination of a little smear from the exudate. The dark-field examination revealed the presence of spirochetes, which was finally substantiated by the Wassermann test and the personal history. Now, there was no induration and no sign of or appearance of a chancre. The lip looked normal, and, as I have said, the only erosion was so minute that I would not have regarded it with suspicion. It is easy for one to be careless in feeling around and examining a mouth of that sort having any little erosion. Examining with the fingers, you say, "I don't find anything wrong with your teeth," and at the same time you assume the chance of being infected. We should examine the lip and tongue before we make any examination of the inside of the mouth.

Fig. 3.—Swelling of lymph nodes adjacent to chancre shown in Figure 2.

Hayes[2] reported the following case of chancre of the lip:

This young man presented himself at the Oral Surgery Clinic of the New York University College of Dentistry with a history of having observed this lesion for three weeks. Clinically, we noticed a thin hemorrhagic scab, brownish in color, with a marked induration of the lip. It was practically painless and associated with a unilateral adenopathy. His physician had swabbed the lesion with silver nitrate. It should be remembered that the constant use of caustics causes induration. The patient was immediately referred for a dark-field examination, and a Wassermann test. Since caustics had been used, the dark-field was negative on the first day. On the second attempt, the patient having been advised not to disturb the lesion, the dark-field was positive; the Wassermann was also positive.

HISTORY

Our knowledge concerning syphilis goes back a long way. Holcomb writes:

Fig. 4.—Lesions on tongue. Figures 4-6 shows phases of latent syphilis.

There is an inveterately recurring belief that syphilis was originally a disease of Haiti which Columbus imported into the Old World when he arrived at Barcelona upon his return from the New World in 1493. This view persists in spite of the generally admitted fact that syphilis under several names was widespread in Europe within a year after the return of Columbus, and four years before the first European contact with the Continental Americas in 1498 (Holcomb, 1934).[3]

According to Ingraham,[4]

The precise statement recorded by Gilinus

in 1497 (Cf. Fouget, 1903) reads: "There is one thing above all others of which I am certain, and that is that this disease is contagious." From this time to the discovery of the specific micro-organisms, by Schaudinn (1905), researches into the cause of syphilis represent the evolution of more than four centuries of medical thought.

Although there is some confusion regarding the origin of syphilis, there are two known facts: first, that the disease is contagious and, second, that the responsible organism is *Spirochaeta pallida.*

In 1926, 1930 and 1936,[1, 5, 6] O'Leary, in excellent papers, discussed syphilis and its significance to the dentist. He stressed the importance of the dental stu-

Fig. 5.—Tongue shown in Figure 4 after two months' treatment.

dent's being informed as to the oral manifestations of syphilis in order that he may (1) recognize the signs of the disease in the oral cavity and refer the patient to a physician for treatment and (2) safeguard himself, his office assistants and perhaps his family against infection.

THE COURSE OF SYPHILIS

The biologic course of syphilis now is subdivided into acute, latent and late syphilis and physicians no longer speak of the primary, secondary and tertiary stages of the disease. The acute phase in the majority of patients includes the first two years of the disease, whereas latency which follows acute syphilis is divided into early and late latency. Early latency usually is observed during the third and fourth year of the infection, whereas late latency appears at approximately the fourth year and may last the rest of the patient's life or may terminate with the appearance of any of the late visceral or neurologic manifestations of the disease.[7]

The Acute Phase.—O'Leary and Williams write:

Syphilologists have limited the acute phase of syphilis to the first two years of the infection, because, in the majority of patients who acquire a chancre, the lesion will spontaneously involute and disappear in a short time and the formerly so-called secondary lesions of the skin and mucous membranes will do

Fig. 6.—Mucous patch on tongue.

likewise; however, occasionally the patient's defensive mechanism is not adequate enough to control the disease, and recurrent episodes of spirochetemia with skin and mucous membrane lesions will recur. These lesions are known as "recurrences" and they are as highly infectious as the original lesions of the skin and mucous membranes. If the patient receives arsphenamine and a heavy metal, these infectious lesions will heal immediately and if the treatment is administered to a sufficient extent the lesions will not reappear. However, if treatment consists of only a few injections, "recurrences" are more likely to appear than if no treatment had been administered. Knowledge of the early course and some ideas about the communicability of the disease have been well crystallized.

For the majority of patients, recurrences cease to appear after the third year of the disease; in fact, it is the rare case in which recurrences develop after the fourth year, because in less than 5 per cent of the cases are the late recurrences observed after the fourth year of the disease.[7]

Latent Syphilis.—Moore and others write:

Latent syphilis can be defined accurately only in terms of the biologic course of syphilitic infection. When the virus is freshly introduced into a nonimmune human being or experimental animal, multiplication of organisms first occurs at the inoculated site, then dissemination by way of the lymphatics and blood stream. In the usual course of events, a chancre develops at the portal of entry, a satellite lymphadenopathy occurs, and, after an interval, the cutaneous, mucosal and constitutional symptoms of early secondary syphilis appear. If the patient or animal is untreated, the lesions of the secondary outbreak heal spontaneously after a variable period of time ranging from a few days to many months. The next few years are marked by their uneventfulness. Either the individual shows no obvious physical evidence of syphilitic infection, or, in a relatively small proportion of cases, there may appear, at variable but gradually increasing intervals, infectious relapses of a secondary type, usually insignificant, transitory, and in most cases, limited to the mucosae. Finally even these cease to occur, and a period of complete quiescence ensues. This is known as latency.

A further definition may be made in terms of clinical latency, serologic latency, and pathologic or biologic latency. These three terms are not mutually interchangeable. Clinical latency means nothing more than clinically nonrecognizable syphilitic infection. This may and often does exist when serologic tests of the blood are positive and when active inflammatory lesions in tissues are present. Serologic latency implies that tests of blood and spinal fluid are negative; under these circumstances, although rarely, both clinical and pathological activity may be evident. Pathologic or biologic latency means that virulent treponemes present in body tissues provoke no inflammatory reaction, the balance between host and invading organisms being temporarily or permanently maintained. This state of affairs implies clinical latency also, though not necessarily serologic latency.[8]

Late Syphilis.—O'Leary and Williams write:

By the fifth year, the keel for the subsequent structure of the disease has been laid, the defensive mechanism has developed to the point of controlling the disease, or else it is lacking, and neurologic involvement or cardiovascular disease or some other late manifestation of syphilis is in the making.

Fig. 7.—Left: Gumma of palate. Right: Gumma of lip. Figures 7-10 show lesions of late syphilis.

It has been the impression that the ability of the infected person to transmit the disease tends to vanish by the fifth year of the infection. This impression, which has been prevalent among syphilologists for many years, is based on the observation that when the period between acquiring the chancre and marriage was more than five years, it was seldom that the marital partner became infected.

Accordingly, syphilis may be considered to be infectious during the first five years the patient has the disease, but each year thereafter the possibility of such a patient transmitting the disease decreases with each year

until it approaches a vanishing point by the tenth year.[7]

Oral Manifestations in Early Syphilis.—Among these manifestations is the extragenital chancre. The lip is the most common site; the tongue, tonsil or gums are other sites. The lesion may be small (abrasion) or large and may be indurated, hard and painless. It may heal spontaneously. The blood test may be negative during the first week and the dark-field examination is necessary. The blood test may be positive after the first week. The extragenital chancre is a constant source of contagion. (Figs. 1-3.)

Stokes,[9] in discussing the extragenital chancre, says,

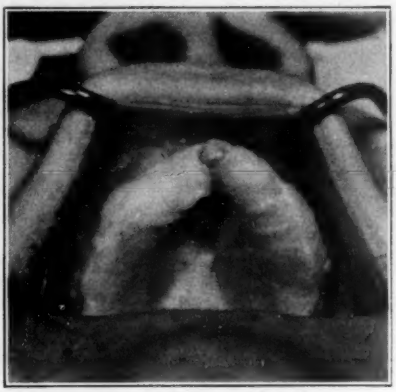


Fig. 8.—Perforation of palate.

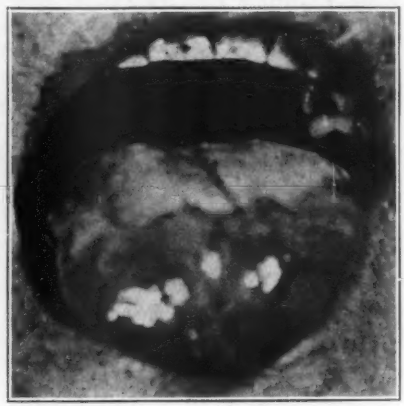


Fig. 9.—Condition of tongue.

The primary lesion of syphilis when it develops on other parts of the body than the genitalia is protected from recognition by a singularly low threshold of suspicion on the part of physicians. A lesion on the genitalia may arouse some suspicion *a priori,* but a lesion on the finger, the lip or the tonsil seldom does. Syphilis seems to be suggested last to the examiner instead of first of all the existing possibilities.

An overwhelming percentage of extragenital chancres occur about the mouth. Berkley found 63 per cent of such lesions about the mouth. Fournier found, in studying 1,124 cases, that 68 per cent of extragenital chancres occurred upon the lips. Cole found 77 per cent on the lips.

Clarke[10] found, in a study of extragenital chancres, that of twenty-four male patients, sixteen had chancre of the lip; and in female patients, of thirty-three extragenital chancres, twenty-four were found on the lip.

The importance of correctly diagnosing the extragenital lesion is even greater than diagnosing the genital lesion, because the patient does not suspect a "venereal disease," and because the disease may spread by kissing, conceivably also by the use of cups, glasses and pipes, in the case of the lip and buccal cavity chancres. Chancres of the fingers are not very uncommon, and can be the means of transmission of the disease.[10]

Chancre of the finger has been seen frequently enough in dentists to warrant special mention. It is often found on the ring finger of the left hand of dentists who use that finger to retract the cheek.[1]

The recognition of the bubo, or the swelling of lymph nodes adjacent to the chancre, is one of the paramount factors in the diagnosis of extragenital chancre, particularly about the mouth. The bubo is painless, does not as a rule suppurate and frequently is not recognized by the patient. The lymph nodes are not particularly hard when palpated, and may appear in clumps or in a chainlike arrangement.[5]

The lymphadenopathy of early syph-

ilis is, of course, a familiar phenomenon. In some patients, it does not recede simultaneously with the spontaneous regression of other early lesions, and the patient carries slightly to moderately enlarged rubbery indurated glands throughout life.

Mucous Membrane Lesions of Acute or Latent Syphilis.—These lesions may be single or multiple, round, oval or irregular and covered with a grayish membrane, and may appear anywhere in the oral cavity. They may be painless and may heal spontaneously. The lesion is a constant source of contagion. (Figs. 4-6.)

Oral Manifestations of Late Syphilis.

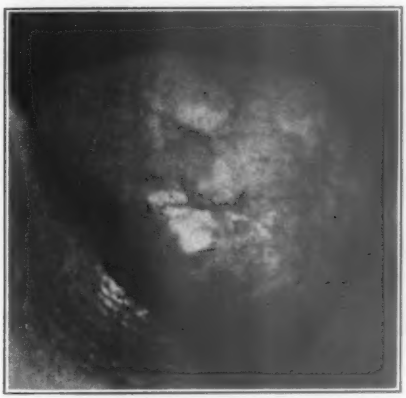


Fig. 10.—Tongue shown in Figure 9 after six months' treatment.

—These lesions commonly involve the lips, tongue and palate, usually varying in size. They may ulcerate and are not considered infectious. They are only occasionally painful and may involve the soft tissue and bones. Leukoplakia is a manifestation of late syphilis.

Stokes,[9] in discussing late syphilis of the lip and mucous membranes, says:

The following types of late syphilis of the lip deserve special mention: 1. Diffuse gummatous nonulcerative syphilis. 2. Ulcerative gummatous infiltration. 3. Solitary gumma of the lip. 4. Nodular and nodulo-ulcerative late syphilis involving the lip and adjacent skin. (Figs. 7-10.)

SYPHILITIC OSTEOMYELITIS

That there is a distinct alteration in the structures of bones due to systemic infection with *Treponema pallidum,* there can be no doubt, and a recognition of these changes, which in most instances are rather characteristic, is a distinct aid in the diagnosis of a hitherto hidden or latent syphilitic background.[11]

Padgett[12] believes that a tendency to recession of the gums with loosening of the teeth is a syphilitic manifestation, more commonly observed in the upper jaw. He says:

The osteomyelitic form of syphilis usually begins as a periosteal gumma and localized swellings are felt in the bone. At first the

Fig. 11.—Syphilitic tongue in case reported. Figures 11-14 show syphilitic osteomyelitis.

skin or mucosa is unchanged, but later it becomes adherent and red and finally necrotic. Characteristic reniform ulcers appear. Underneath the involvement the bone is invaded, producing rarefaction, discernible in the roentgenogram. When invaded at several points, a mottled appearance is given. The whole picture is not one of destruction. Hand in hand with destruction is some true proliferation. In the center of a gummatous process is found a generalized necrosis in which the nuclei of the cells are not well preserved.

Lovett and Wolbach[13] write:

Syphilitic osteomyelitis is considered to be a severe reaction to the infection. This is evidenced by cortical destruction and, with

the exception of co-existing periostitis, may resemble a pyogenic bone infection.

These authors also consider that bone proliferation is a response to a mild reaction to the organism or its toxin.

Delafield and Prudden[14] are of the opinion that "the periosteum becomes edematous and infiltrated with pus, and the surrounding soft parts may become the seat of intense inflammatory changes." They also believe that abscesses of the periosteum or surrounding tissues are apt to form. As a result of these changes, necrosis of greater or lesser portions of the bone may ensue, with the formation of large or small sequestra.

In syphilitic osteomyelitis with necrosis of the bone, the separation of the sequestrum is often slow because of the decrease in vascular supply from the endarteries.[12]

Thoma[15] believes that syphilitic osteomyelitis occurs more frequently in the mandible than the maxillae and that it resembles suppurative osteomyelitis, but is apt to be more progressive, does not improve with local treatment and improves rapidly with antisyphilitic treatment. Occasionally, a large sequestrum is formed.

Thoma reported a case of a man who was being treated by his dentist for an abscessed tooth. Because no progress was being made, and his jaw was swollen and sore, he went to his physician, who referred him for x-ray films and treatment. The roentgen and clinical examination of the mandible at this time gave the impression of osteomyelitis of the mandible. All of the mandibular teeth were removed. In a few days, however, the condition became worse; which led to incision and drainage. The patient's discomfort continued and swelling increased, and further studies were made. A Wassermann test proved to be positive. The diagnosis of syphilis was then made and antisyphilitic treatment instituted, to which the patient responded very well.

Ungerman[16] and his associates believe that syphilis affects bone in a greater variety of ways than any other single disease, and that here again syphilis proves to be an imitator.

REPORT OF A CASE

History.—M. M., a widow, aged 42, colored, seen October 20, 1938, a well-nourished and cooperative patient, complained chiefly of recession of the gums and looseness of the teeth on the right side of the upper jaw. The husband had been killed in an accident several years before, and the patient now held a responsible position with the company that had employed her husband. Her mother, father and one sister were living and well. There were no children and there had been one miscarriage. The patient had had "joint pains" for some time and was under the care of the family physician, who had prescribed several kinds of pills, which had given no relief.

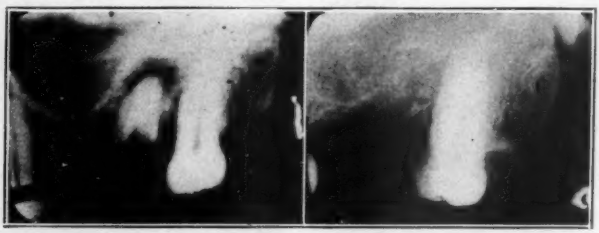


Fig. 12.—Left: Roentgenogram before extraction. Right: Roentgenogram after extraction.

March 16, 1938, the patient, on the advice of her physician, went to a dentist for the removal of a "badly broken-down" upper right molar tooth. Roentgenograms of the maxillary right molar region revealed a radiolucent area above the second molar

tooth. Under local anesthesia, the second molar was removed. Convalescence was uneventful. In April, the patient noticed swelling of the gums about the maxillary premolar teeth on the right side of the face, which she thought was a "gum boil." Hot flaxseed poultices were applied. Roentgenograms of the area from which the tooth had been removed in March were reported as negative.

The patient experienced little discomfort until September, when she noticed that the gums were slightly swollen and deep red from the second incisor to the second premolar region, and that there was a foul discharge into the mouth which seemed to come from around the loose teeth. Nothing further was done until the patient was seen in this clinic.

Fig. 13.—Ulcerative gummatous infiltration.

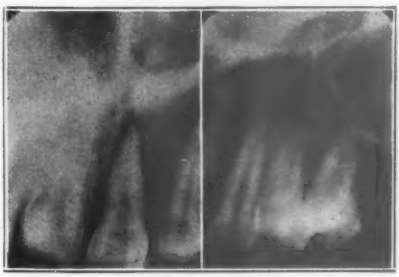


Fig. 14.—Roentgenogram of area in Figure 13.

Examination (November 2).—The alveolar plate on the right side of the maxilla was exposed, but there was no pain. The sequestrum was freely movable and was found to contain the second incisor, the canine and the first premolar, which were extremely loose. A roentgenogram revealed an osteomyelitis that extended from the region of the first incisor posteriorly to the second premolar. In spite of the negative medical history, blood was taken for serologic study, and the patient was given another appointment.

Course and Diagnosis.—When the patient returned one week later, she was now of the opinion that should it be found necessary to remove the loose teeth, the dentist who had extracted the first tooth should be held responsible for "spreading the infection," and she stated that she intended to take legal action against him. On this visit, the patient was accompanied by a "legal advisor." However, the Wassermann report had been received by this time, and the reaction had been found strongly positive. A diagnosis of late syphilis was made, and when the significance of this was explained to the patient, she again became cooperative and dismissed any idea of "legal action" against her dentist. The patient denied having had a pri-

Fig. 15.—Sequestrum removed.

Fig. 16.—Late prenatal syphilis.

mary lesion or any manifestation of or treatment for syphilis.

Treatment.—Treatment was started and the sequestrum was then removed. It was found necessary to remove the first incisor and the second premolar because of exposure following the removal of the sequestrum, which contained the second incisor, canine and premolar.

Antisyphilitic treatment by the patient's physician was very satisfactory. Drainage stopped shortly and, in another month, a partial denture was made. The patient returned to the clinic after the completion of the denture and the first series of "injections," both of which were very satisfactory. She was seen again in October 1939, at which time she was still under treatment. There were no further developments in the mouth and the patient seemed well satisfied. (Figs. 11-15.)

Fig. 17.—Rhagades in late prenatal syphilis.

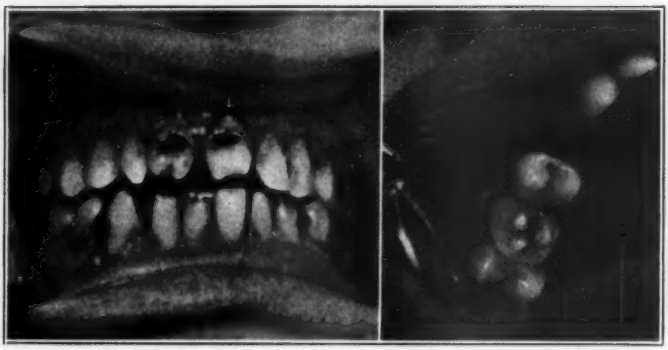


Fig. 18.—Hutchinsonian incisors (left) and hutchinsonian incisors and mulberry molar (right) in late prenatal syphilis.

LATE PRENATAL SYPHILIS

The term "late prenatal syphilis" is now being applied to what was formerly known as "congenital syphilis." It is a phase of the syphilis problem in which the symptomatology is diverse. The sequelae of undiagnosed and untreated cases are devastating, and the toll to the community is great, according to cooperative group studies. This group believes prenatal syphilis should be treated while the child is *in utero*. In some cases, however, the true condition is discovered only after birth. If this is so, the treatment of syphilitic infants in the first two years of life is much more advantageous than treatment given after this period.

In 1,100 cases of late prenatal syphilis studied by the cooperative group, a

number of individuals were admitted with several manifestations. Interstitial keratitis, the principal manifestation, occurred in approximately 33 per cent of the patients, while on admission 39 per cent had as the only evidence a positive blood serologic test.[17]

Skidmore, a dentist, examined at the Wills Hospital (eye) in Philadelphia 100 patients who had prenatal syphilis, and who were being treated for interstitial keratitis, and he found that the deciduous teeth are of no diagnostic value, but the hutchinsonian incisor and the mulberry molar may be considered as pathognomonic. The incisors and the first molars in both the maxillae and the mandible may be involved. The open bite has recently led to investigation in this field. At the same time, it should be kept in mind that there are non-syphilitic serrations and notchings of both the incisors and the molars.

In 1856, Hutchinson observed the effect of hereditary syphilis on the permanent teeth. The term "hutchinsonian incisor" has since this time directed the dentists' thoughts to congenital syphilis.[18] Although the so-called textbook picture of the hutchinsonian incisor is that of a "notched" incisor, it must be remembered that such teeth may be crescent shaped, "screwdriver" shaped, truncated or "pegged."[19]

Karnosh[20] believes that the true hutchinsonian incisor shows a deformity of the developmental lobes of the permanent central incisor and not a transitory calcium deficiency, and that the mulberry molar of syphilis is a first permanent molar characterized by enamel cusps showing crests of sound enamel on a base of hypoplastic deposits. These cusps are generally crowded together on a crown surface of dwarfed dimensions.

Stokes,[9] in answering the question "Should a diagnosis be based on teeth alone?" writes, "The classical hutchinsonian tooth can be regarded as practically pathognomonic, and I have never known the finding to remain unconfirmed by history or course." In studying the second dentition in 130 cases of congenital syphilis, he found the following: normal teeth, 30 per cent; syphilitic incisors, 28.5 per cent; suggestive incisors, 4 per cent; mulberry molars, 3 per cent; pegged teeth, 10 per cent; aplastic teeth, 10 per cent; serrated teeth, 8 per cent; dystopic teeth, 2 per cent; and unclassified, 15 per cent.

O'Leary believes that hutchinsonian teeth are outstanding stigmata of congenital syphilis, and that the percentage of cases of congenital syphilis presenting these manifestations would be approximately 75. (Figs. 16-18.)

BIBLIOGRAPHY

1. O'LEARY, P. A.: Syphilitic Lesions of Mouth. J.A.D.A., 13:305, March 1926.

2. HAYES, L. V.: Clinical Diagnosis of Diseases of Mouth. Brooklyn: Dental Items of Interest Publishing Co., Inc., 1935.

3. HOLCOMB, R. C.: Holy Wood and Haitian Myth of Origin of Syphilis. *Publ. Am. A. Adv. Sc.*, No. 6. New York: Science Press, 1938.

4. INGRAHAM, N. R., JR.: *Publ. Am. A. Adv. Sc.*, No. 6. New York: Science Press, 1938.

5. O'LEARY, P. A.: Oral Syphilis. J.A.D.A., 17:413-419, March 1930.

6. *Idem:* Significance of Syphilis to Dentist. J.A.D.A., 23:1523-1529, August 1936.

7. O'LEARY, P. A., and WILLIAMS, D. H.: Appraisal of Infectiousness of Syphilis: A Study of Conjugal Syphilis. *Proc. Staff Meet. Mayo Clin.*, 15:1, January 3, 1940.

8. MOORE, J. E., *et al.:* Latent Syphilis. Reprint 45. Vol. 13, Nos. 8-12, 1932; Vol. 14, No. 1, 1933. (U. S. Public Health Service Bull.)

9. STOKES, J. H.: Modern Clinical Syphilology. Philadelphia: W. B. Saunders Co. 1934.

10. CLARKE, C. W.: Chancres Studied from Public Health Point of View. *Ann. Int. Med.*, 13:928, December 1939.

11. STEWART, D. M.: Roentgenological Manifestations in Bone Syphilis. *Am. J. Roentgenol.*, 40:215, August 1938.

12. PADGETT, E. C.: Surgical Diseases of Mouth and Jaws. Philadelphia: W. B. Saunders Co., 1938, p. 303.

13. LOVETT, R. W., and WOLBACH, S. B.: Roentgenographic Appearance, Diagnosis and Pathology of Obscure Cases of Bone Lesions.

Surg. Gynec. & Obst., 31:111-131, August 1920.

14. DELAFIELD, FRANCIS, and PRUDDEN, T. M.: Text-Book of Pathology. Ed. 11. Baltimore: William Wood and Company, 1919, p. 1056.

15. THOMA, K. H.: Clinical Pathology of Jaws. Springfield, Ill.: Charles C. Thomas, 1934, p. 130.

16. UNGERMAN, M. D.; VICARY, W. H., and ELDRIDGE, W. W.: Luetic Osteitis Simulating Malignant Disease. *Am. J. Roentgenol.*, 40: 224, August 1938.

17. Late Prenatal Syphilis with Special Reference to Interstitial Keratitis: Its Prevention and Treatment. Reprint 64, Vol. 18, 1937. (U. S. Public Health Service Bull.)

18. HUTCHINSON, J.: Influence of Hereditary Syphilis on Teeth. *Lancet*, 9:449; 10: 187, 1856.

19. *Idem:* Heredito-Syphilitic Stigmata on Teeth as Means of Diagnosis. *Brit. M. J.*, 1:515, 1861.

20. KARNOSH, L. J.: Histopathology of Syphilitic Hypoplasia of Teeth. *Arch. Dermat. & Syph.*, 13:26, January 1926.

SULFATHIAZOLE IN THE TREATMENT OF FRACTURES OF THE MANDIBLE

By THOMAS R. HADDOCK,* D.D.S., Fort Sill, Okla.

MOST oral surgeons are agreed that a majority of fractures of the mandible and maxillae are compounded into the oral cavity, and, as a result, are potential infected wounds.

While no accurate percentage can be given of the number of infections in the fracture area that follow reduction and fixation, it is undoubtedly high, as will be shown by the series of control cases reported herein. These infections, which are frequent, result in delayed union and call for a long period of hospitalization. Often, they impair the end-result. There may be extensive loss of bone structure from osteomyelitis, with accompanying deformity and disability.

Sepsis was the chief factor in delay and complications of repair in maxillofacial wounds incurred in World War I. Between 800 and 900 of the men who incurred injuries of the maxillofacial region in the American Expeditionary Forces required hospital treatment after their return to the United States. Of the 1,123 gunshot fractures of the mandible which occurred in the A.E.F., records show that 11 per cent resulted in nonunion or in a union demanding bone grafting. The non-union in these cases was attributed not to lack of early fixation, but to extensive shattering of the bone followed by infection and necrosis.

There are numerous accounts in the literature of the favorable results of chemotherapy in the treatment of such virulent infections as staphylococcic bacteremia, acute osteomyelitis and acute infectious arthritis. The value of sulfanilamide or sulfathiazole in infected wounds, in clean operative wounds and in fractures of the long bones has been demonstrated conclusively.

In a recent report, submitted to the Surgeon General of the Army by Perrin H. Long, of Johns Hopkins University, and I. S. Ravdin, it was revealed that the use of sulfonamide therapy in the treatment of wounds after the Japanese bombing attack on the Honolulu area, December 7, saved hundreds of lives that might have been lost. The report stated further:

*Captain, Dental Corps, U.S.A.

We have been impressed again and again with the incalculable value of sulfonamide therapy in the care of many of the casualties. We believe that it is highly important that physicians, both civilian and military, become familiar with the general and specific considerations which govern the oral and local use of the sulfonamides in the treatment of wounds and burns, and that, in so far as it is possible, routine methods for the use of sulfonamides in casualties be devised and adopted.

It is hoped that the evaluation of sulfathiazole therapy in the cases herewith presented may be of value in determining the place of chemotherapy in maxillofacial surgery.

TABLE 1.—RESULTS OF TREATMENT IN FIFTEEN CONTROL CASES OF FRACTURED MANDIBLE (NO SULFATHIAZOLE)

Fracture			Infected	Not Infected	Infected Per Cent	Duration of Hospitalization (Average)
Single	Multiple	Cellulitis				
9	6	9	7	8	46.6	34.4 days

TABLE 2.—RESULTS OF TREATMENT WITH SULFATHIAZOLE IN EIGHTEEN CASES OF FRACTURED MANDIBLE*

Fracture			Infected	Not Infected	Infected Per Cent	Duration of Hospitalization (Average)
Single	Multiple	Cellulitis				
11	7	8	2	16	11	25.4 days

*Average duration of sulfathiazole therapy, 8.1 days; duration of drainage in the two cases, 5 and 9 days, respectively.

ANALYSIS OF CASES

A control group was obtained by selecting the fifteen previous consecutive cases of fracture of the mandible admitted to Post Hospital. Neither the severity nor the number of the fractures sustained in each case was considered, as a representative group was desired. The hospital record of each of these cases was then carefully checked to obtain the necessary information as to type of injury, method of treatment and progress.

The next eighteen consecutive cases of fracture of the mandible received treatment similar to that of the control group; but in addition prophylactic doses of sulfathiazole were prescribed. An initial dose of 4.0 gm. was given soon after admission, then 1 gm. four times daily. This was continued for from four days to three weeks, as the case warranted. Where there was sufficient access to the fracture area through loss of teeth or bone, daily implants of sulfathiazole were made.

In evaluating the results as a whole, all cases in which measurable suppuration from the fracture area was demonstrated were considered infected, regardless of duration. Reduction and fixation, in most of the cases, were by the use of multiple loop wiring and intermaxillary elastics.

The incidence of infection has been reduced from 46.6 to 11 per cent by the local application and oral administration of sulfathiazole. Likewise, the required period of hospitalization has been reduced nine days.

COMMENT

These results should be viewed conservatively, as this presentation is a pre-

liminary report on a relatively small number of cases. Further observation of a larger series of fractures of the mandible will be necessary before a positive evaluation of sulfathiazole therapy can be made.

Sulfathiazole was selected because it is a more effective agent than sulfanilamide against the staphylococcus, and consequently should be more effective in combating infection in the line of fracture and its occasional sequelae, osteomyelitis, the predominating infecting organisms of which is the staphylococcus.

In direct contrast to sulfanilamide, sulfathiazole can be given with a reasonable degree of safety. In the series of cases presented, its administration resulted in nausea in only one case, and transient dizziness and malaise in only four cases. No sulfathiazole dermatitis was noted, nor was it necessary at any time to withdraw the drug because of toxic manifestations.

Until the introduction of the sulfonamides, many agents had been tried in an attempt to inhibit the action of or destroy the common pathogenic oral organisms that frequently invade the fracture area.

Much time and patience have been devoted to daily irrigation or application of azochloramid, surgical solution of chlorinated soda, gentian violet, merthiolate, etc.; with slight or no value.

Pyogenic infection has continued to occur, with serious consequences, in a large percentage of fractures of the mandible.

There are available well developed technics that, properly applied, meet the mechanical requirements of treatment satisfactorily.

The localized infection in the fracture area due to invasion by organisms from the oral flora has remained the major complication in treatment.

It is doubtful that sulfathiazole is a panacea, but the results obtained from this series warrant further investigation.

CONCLUSIONS

1. In a series of eighteen cases of fracture of the mandible, the administration of sulfathiazole by mouth was employed together with daily implantation of sulfathiazole powder when there was access to the fracture area. A comparative analysis of this group and a control group of fifteen cases shows a marked reduction in the percentage of infection from the sulfathiazole therapy.

2. This is a relatively small series of cases and no attempt can be made to arrive at a definite conclusion. However, the results have been sufficiently satisfactory to warrant a more extensive study.

BIBLIOGRAPHY

1. Medical Department of U. S. Army in World War. Vol. 9, Surgery, Part 2.

2. SPINK, W. W.; HANSEN, A. E., and PAINE, J. R.: Staphylococcic Bacteremia—Treatment with Sulfapyridine and Sulfathiazole. *Arch. Int. Med.*, 67:25, January 1941.

3. DICKSON, F. D.; DIVELEY, R. L., and KIENE, R.: Use of Sulfathiazole in Treatment of Subacute and Chronic Osteomyelitis. *J. Bone & Joint Surg.*, 23:516, July 1941.

4. BELING, C. A.: Treatment of Staphylococcic Infections with Thiazole Derivatives of Sulfanilamide. *Am. J. Surg.*, 53:219, August 1941.

5. SPINK, W. W.: Sulfanilamide and Related Compounds in General Practice. Chicago: Year Book Publishers, Inc., 1941.

Post Hospital.

A CONSIDERATION OF DENTURE BASE MATERIALS AND A TECHNIC FOR THEIR USE

By I. Lester Furnas, D.D.S., La Jolla, Calif.

WELL within the memory of most men who are now practicing prosthetic dentistry, nothing was considered as threatening the supremacy of vulcanite as a denture base material. Many substitutes were tried, but each was found wanting in many respects. Every prosthetist knew full well that vulcanite was seriously lacking in many respects and hoped for the day when a more satisfactory material might be developed.

While investigation and research were constantly being carried on and many materials were introduced to the profession only to be discarded as proven failures, it was not until the late twenties that chemists and physicists began to produce synthetic resins singly and in combinations that seemed to offer some promise of success.

It is not within the scope of this discussion to recount here the many, many materials that were offered to the profession as the last word in denture base material, but, failures though they were, it is only fair to say that each played an important part in the march of progress as we know it today. Tomorrow, we may see an entirely different picture in which today's materials will be classified with vulcanite, celluloid and other similar products of the past.

In this discussion, I propose to deal with base materials purely from the viewpoint of their practical application. Much has been said and written regarding their chemical composition and physical properties as established by accurate and scientific means in the research laboratories. I shall deal with them only as regards facts established by practical application and experience in my practice, limited entirely to the construction of full and partial dentures. It is interesting to note that these facts gained from personal experience and practical application vary but little from the findings of research technicians in the experimental laboratories. However, in a few instances, it is difficult to reconcile apparently different results when the tests seem quite similar.

I have by no means used all of the various and sundry denture base materials now on the market, but I have used most of them, at least experimentally. The technic of processing is quite similar for most of them. However, for the two materials that I have chosen, there are some important differences that must be observed if success in their use is to be attained.

For purposes of brevity, explanation and demonstration, I shall limit my remarks to two materials. While these two materials are in many ways quite similar, they cannot be processed by the same technic. I choose them not only because they are the materials with which I am most familiar, but also because I believe them to be perhaps the best representatives of two popular types of resins now most generally in use.

To represent the acrylic resin group, I have chosen that material sold under the

Read before the Section on Full Denture Prosthesis at the Eighty-Third Annual Meeting of the American Dental Association, Houston, Texas, October 28, 1941.

trade name of Vernonite, and as the best example of the polyethene materials, I shall speak of what is sold as Luxene 44. Before discussing the detailed technic of processing these two materials, let us make some general and broad comparisons of their general physical characteristics when used in practical cases.

Tissue tolerance: With correct curing, there is so little difference that one material cannot be said to be better than the other. However, when either material is ever so slightly undercured, it will be found that some mouths will show a definite reaction in the form of severe irritation of the mucosa.

Odor: There is none for either material.

Taste: There is none for either material.

Effect of oral secretions: There is none for either material.

Esthetic appearance: This is very good in each case.

Tensile strength: Vernonite ranks somewhat higher than vulcanite and Luxene 44 outranks Vernonite in about the same ratio.

Shock resistance: The two are again about the same, with perhaps a slight edge favoring Luxene 44.

Surface hardness: This is sufficient in each material for taking and maintaining a high polish.

Ease of processing: Luxene 44 requires a much more detailed and accurate processing technic, with the exception of the curing process, than does Vernonite.

Absorption: Vernonite has a comparatively high rate of absorption as compared to Luxene 44.

Warpage: Vernonite shows a considerable tendency toward warpage. Especially is this true when repair, rebasing or relining is necessary. Luxene 44 shows very little change.

Thermal conductivity: Both materials show very poor conductivity.

Inhibiting bacterial growth: Both materials show a slight tendency toward inhibiting bacterial growth.

Weight: Vernonite is the lighter.

So it is plain to be seen that each material has its advantages and disadvantages, and the choice depends on the operator's personal taste. There are a few general rules that experience has taught me to observe in that strict adherence to them will save much time and will pay big dividends in the results obtained.

1. Accurate and meticulous tinfoiling of the case and cast are absolutely essential. On the wax surfaces, I use a 0.003 foil, and on the cast, 0.001.

2. In flasking, only the best and strongest artificial stone should be used. It is my belief that, for best results, plaster of Paris has no place whatsoever in the flasking of any of these materials. Only a flask of the ejector type should be used. The method of removing the case from the stone matrix will be described later.

3. A temperature above 100° C., such as might be obtained by using a vulcanizer, should not be used in the curing process. To use it will definitely increase the dimensional change in the Vernonite and will destroy all color in the Luxene 44, changing it from the normal pink to a light brown or black, the shade depending on the time and temperature rise.

4. Careful packing and testing are essential. Waste gates should not be used.

I believe these four general rules to be absolutely essential if the maximum results are to be obtained in the use of these and similar materials.

Now let us proceed step by step with the processing of these materials in a practical case and see wherein the technic differs and how some of the difficulties may be overcome.

First, we shall process the case, using Vernonite and starting with the flasking process. An ejector type flask should

be used in order to facilitate removal of the denture after curing. I find the Luxene or the Hanau flask suitable for this purpose. We are sadly in need of a larger, stronger flask of this type for the use of these materials. The flask should fit together so accurately that, when assembled, it will hold water without leakage between the two halves.

The wax denture pattern is sealed to the cast all around the periphery and placed in water. This insures a good union between the cast material and the flasking material. The flasking stone is now carefully mixed, the operator incorporating into the mix as much of the powder as is compatible with keeping the mix workable. My choice of a flasking stone is "castone." The bottom half of the flask is now filled level with the top and the cast is removed from the water bath, the surface moisture removed with a towel and the cast embedded in the freshly mixed stone up to or slightly above the borders of the cast. When the stone has set sufficiently hard to be smoothly trimmed, the excess is cut away flush with the top border of the flask and to the peripheral margin of the cast. This entire surface is now coated with any good separating medium and allowed to dry.

The case is now carefully inspected to make sure that the porcelain teeth are free of all wax particles that might cause them to become loose in the second half of the flask when the wax is flushed after heating. The wax pattern is now carefully tinfoiled, with a foil 0.003 in thickness. The foil should cover every particle of wax and as little porcelain as possible. A broken agate spatula, the kind used for mixing synthetic porcelain, which can be rounded and polished, and a sharp "Gem" safety razor blade are to me almost indispensable in foiling a case. The agate will pull, draw and burnish the foil without tearing or making wrinkles and the razor blade is ideal for trimming away the excess.

If the Luxene flask is used, the Luxene tinfoiling device may be used to seat the foil firmly to the wax pattern. However, this is not necessary if the foiling has been done carefully. I have a definite fear of moving some of the teeth, although I have never seen this happen.

The second or top half of the flask is now put in place and another mix of stone is made as previously described and carefully but vigorously vibrated into place. The operator should be on the lookout constantly for air bubbles in this mix of stone and, at the same time, be absolutely sure that the stone covers every portion of the tinfoiled denture and teeth evenly and in every detail.

The top of the flask is now pressed to place and the case put to one side until the stone has thoroughly set.

The excess set stone is now removed from the top of the flask and the flask placed in a 1-gallon stew pan three-fourths filled with cold water and set over a gas burner with the flame at about one-half force. Too rapid boiling will melt the wax unevenly. An ordinary wire potato masher that has been spread slightly makes an excellent instrument for handling the flask while in the water.

While the water is slowly coming to a boil, all the other instruments and equipment should be placed in readiness for instant use, because much time can be saved if the flask is not permitted to cool to the point where reheating is necessary.

The materials and equipment consist of the following:

One large size double boiler.
Canvas gloves for handling the hot flask.
Long-handled dipper with a three-quarter inch hole in bottom.
Commercial chloroform.
Two sheets of cellophane for testing.
Tinfoil (0.001) for the cast.
Foiling and burnishing instruments.
Cutting and packing instruments.
One can of Vernonite (unopened).

The water will come to a boil slowly and the flask should be allowed to remain

in the boiling water for about five minutes to make sure that the wax is thoroughly melted and that the flask is heated to an even temperature. The flask is now lifted from the boiling water and all melted wax allowed to run from the matrix. The long-handled dipper with the hole in the bottom is now used to flush boiling water into the two halves of the matrix and remove all wax possible by this method. Now the two halves of the flask are inverted to drain off all water and, while this is taking place, the remaining boiling water is poured into the bottom part of the double boiler and returned to the fire. Now enough commercial chloroform is poured into the top part of the matrix to fill it approximately one-half full. This will cut all remaining wax film from the matrix. Acetone may also be used for this purpose if desired. A small piece of gauze about 8 inches square is saturated with the excess choloroform and the cast portion of the matrix cleaned. Both halves of the flask are inverted and all chloroform is drained out, and the flask dried with compressed air. The top half of matrix is inspected carefully for particles of castone that may have run between the tinfoil and the wax, and placed in the top half of the double boiler and covered. This will keep the top half of the flask hot and away from all moisture while the cast portion is being tinfoiled and prepared.

Graduated layers of No. 60 tinfoil, having been prepared when the relief areas were determined, are now put in place, and over this one layer of 0.001 foil is placed, covering the entire cast. The foil is burnished to place and the excess trimmed away. The Luxene tinfoiler may be used here to advantage and with safety.

When this is completed, the hot upper half of the flask is taken from the double boiler and the bottom half, which will have cooled slightly, is put in its place. The unit of Vernonite is opened and the Vernonite cut into strips approximately 1-inch long and from one-eighth to one-quarter inch wide. These strips are laid in the hot flask and pressed firmly to place until the case is overpacked. The case is then covered with two thicknesses of dry cellophane and the bottom half of the flask is removed from the double boiler and pressed to place firmly with the hands. An ordinary pair of canvas gloves comes in very nicely at this stage. The flask is now placed in a strong flask press that distributes evenly the closing force, and pressure is slowly applied.

When the flask is still open about 2 mm., the excess Vernonite should show all around the joint. Pressure is continued slowly until the flask approaches an even closing, lacking about 1 mm. This relation is held for about three minutes, then the flask press is released, and the flask removed and opened. The two sheets of cellophane are removed and all excess material is cut away. A thin strip of the material somewhat larger than a wooden kitchen match is placed directly over the crest of the ridge and the flask closed again. The flask is placed in the flask press and is slowly but firmly closed until the two halves are in complete contact at all points.

This entire operation can easily be accomplished with one heating of the flask. However, if the material has a tendency to pull away from the sides of the matrix when the separating cellophane is removed, the flask is a little cooler than it should be. There is an advantage now in letting the flask rest until it has cooled to almost room temperature, and then starting the curing process. This is not absolutely necessary, however.

Improper curing of this material has, I believe, been responsible for at least 90 per cent of failures. This so-called cure is peculiar in that the material seems to remain almost static during the temperature raise until it reaches ap-

proximately 80° C., when a chemical change takes place almost with the suddenness and force of an explosion, after which the cure is almost complete.

It is the suddenness and force of this explosive cure which have been the cause of breakage of so many posterior teeth in dentures made from this material. Some operators have contended that this breakage is caused by the pressure necessary to close the flask, but I am convinced that this is not the case.

In support of this contention, I cite an experiment which I made in this connection: A case was flasked in stone, heated and flushed in the usual manner. The flask was allowed to cool overnight and was then packed cold. A considerable excess of material was used in packing. I then took the case to a nearby printing office where there was a press capable of exerting many tons pressure. I placed the flask in this press and slowly, but without interruption, forced it completely closed. I held it in this relation for twenty-four hours, at which time I removed and opened it. The stone was fractured in several places, but the material had completely filled every detail of the matrix, even to paper thin fins filling the cracks in the stone, but not one tooth was fractured. I realize that one test might not be accepted as positive proof. However, I am convinced that the closing process has little or nothing to do with the fracturing of teeth.

I have used experimentally temperatures varying from room temperature to 240° F., and time ranging from one hour to sixteen hours. I believe that the secret of success lies in raising the temperature to and past the curing point just as slowly as possible, thereby reducing the speed of the cure to a minimum.

I have obtained the best results with the following simple technic:

The pressed case is placed in the flask press and under pressure in a pail of cold water or in water not exceeding the temperature of the flask. The flask is now placed over a very low fire and allowed to come to a boil in four hours. The case is boiled for thirty minutes, then slowly cooled. If this technic is followed, it will not even be necessary to look for broken teeth. If the ejector type of flask has been used as recommended, the removal of the case from the flask is a simple matter, and the removal of the denture from the stone is just as simple.

Holding the invested case in the left hand, starting at the heels, the operator starts tapping with light but firm blows with an ordinary tack hammer, turning the case in the hand and following the line of union between the two halves. The case is completely encircled two or three times, then is tapped around once or twice with blows about midway between the joint of the two halves and the top of the second half of the investment. The top and bottom are covered with similar tapping blows, when the entire case will crumble and the denture can be removed with the fingers. Just a little experience will soon teach one just how much force to put into these tapping blows to get the desired results.

The tinfoil is now stripped from the denture, the flashing trimmed away and the rough trimming that is necessary done with an arbor band chuck. The festooning is smoothed with vulcanite finishing burs. The trimming around the necks of the teeth and the lingual festooning are done with large cross-cut fissure burs and the largest size round burs.

A good pair of binocular loupes make this work much easier and more accurate. Laboratory Burlew wheels remove the bur marks and the final polishing is done on the lathe, first with laboratory pumice stone and water and then with whiting and water.

To return to the processing of the case, using the other type of base material, to see wherein the two differ in technical

procedure: As has already been pointed out, Luxene 44 is an entirely different material and must be handled in a different manner. Because of the fact that this material required much greater pressure in pressing the material into all the fine details of the matrix, the first difference noted is that it must be flasked with the "closed mold" technic. This is done as follows:

The cast is trimmed with a slight taper from the base to the peripheral reinforcement. When the cast is set in the stone investment in the first half of the flask, at least one-eighth inch of the cast remains exposed above the investment. The excess stone investment is trimmed away, this definite tapering shoulder being left all around the cast. The second half of the flask, when poured, covers this edge, so that when it is separated and the wax pattern removed and the two halves are placed back together, this effect is obtained. The flask may be open one-eighth inch, but the matrix inside the flask will be nearly closed, the closure depending on the amount of taper trimmed in the cast. This confinement of the material makes it possible to exert terrific pressure in the mold, thereby driving it into every possible part of the matrix.

Another difference that will be noted is the fact that this material works much more slowly and requires much greater heat, and therefore, when the flask is all ready to be packed, it is advisable to place a sheet of cellophane between the two empty halves and to place it in boiling water and leave it there for at least ten minutes.

The flask is now removed from the boiling water and all moisture blown out by compressed air. The Luxene 44 is cut in strips somewhat smaller than those described for Vernonite and the case is packed to a point where an excess is assured. Two thicknesses of dry cellophane are placed between the halves of the flask to aid in separating and protecting the tinfoil on the cast and the flask is closed and placed in the flask press. It is advisable to have the flask press hot so that it will not extract the heat from the flask. The flask should be closed slowly, to give the material time to flow and take its place in the mold. By the time that the flask is closed except for 1 to 1.5 mm., great pressure will be required, and the joint between the halves should be sealed completely with excess material. The flask press and flask should now be placed in boiling water and allowed to remain for ten minutes. Every three minutes, the press is removed and a partial turn is applied to close it a little more. At the end of the ten minutes, the flask should be almost completely closed. The case is allowed to set on the laboratory bench for fifteen minutes. At the end of this time, the flask is removed and opened and the cellophane and excess material are removed. Strips of Luxene 44 about half the size of a lead pencil are placed around the crest of the ridge and the case is returned to the flask press, with closing and boiling, closing and boiling, until the flask is entirely closed.

Because the curing process of this material is entirely different from that described for Vernonite, it is not necessary to be so careful during the temperature rise.

The case is simply placed in boiling water and allowed to remain there for one and one-half hours, when it may be removed and allowed to cool. Even a forced cooling does not seem to hurt this material.

The removal from the flask and finishing are exactly as described for Vernonite. However, in the finishing, a superior toughness and hardness can be easily noted.

As before stated, the principal advantage of this material over the acrylics is its resistance to absorption, its strength and the fact that it can be repaired, rebased or relined without change of form.

The acrylics are easier to process and have a slightly better color.

Other than this, these two materials work and act very much alike. Good dentures can be and are made from both of them, and preference for one or the other is largely a matter of choice on the part of the operator. They are both still new and both will be improved if not displaced by a new and better material. The end is not yet, by any means.

In the meantime, let no man be ashamed to admit that he occasionally finds a case in which nothing seems to "fill the bill" quite so well as vulcanite.

928 Silverado.

IS CHEWING GUM A SAFE DENTAL THERAPEUTIC AGENT?

By LOUIS M. FLEISCH, D.D.S., Topeka, Kan.

THERE have been persistent advertising campaigns by certain chewing gum manufacturers suggesting to the dental profession that the use of chewing gum is an efficient means of systematic masticatory exertion. They assert[1] that the use of chewing gum presents a physiologic approach to the development of an efficient dental apparatus and to the maintainance of its vigorous health. The individual wrappers of one popular brand of chewing gum state "chewing aids teeth." Another brand has on its wrapper "helps keep the teeth white." Literature[2] has been prepared to teach our children that "chewing gum helps develop the jaws, exercises the teeth, and helps to keep the teeth clean." These statements convey to both profession and laity that chewing gum is a safe and efficient therapeutic agent.

Wiecking[3] has said: "Erroneous information is sometimes given out by advertising firms. With slogans they often teach wrong things more successfully than we teach right ones." This statement seems peculiarly fitted to the chewing gum manufacturers. It also suggests that we should scrutinize these efforts to increase the sale of chewing gum to determine whether they are in the interest of public health. It shall be the purpose of this paper to consider the available evidence regarding the effect of chewing gum upon the teeth.

The most plausible claim for chewing gum is that it provides masticatory exercise. Russell and Bayles[4] report the use of chewing gum preparatory to the use of sponge rubber, cut in the shape of a horseshoe, in the treatment of rheumatoid temporomandibular arthritis. Thereafter, increasingly firm rubber is used and the device is kept in the mouth several hours a day. The period of slowly increasing function of the jaw after the acute stage (rheumatoid temporomandibular arthritis) lasts from one to two months, rarely longer.

Brekhus[5] *et al.*, during a study of stimulation of the muscles of mastication, after a number of experiments with several materials, selected paraffin for its toughness, elasticity, resistance to pressure and lasting quality. A group of forty-six male students were given an assignment to chew one one-half inch

Read before the Shawnee County (Kansas) Dental Society, October 1941.

cube of paraffin one hour each day for fifty consecutive days. The average bite pressure of the group was 118 pounds at the beginning of the experiment. After fifty consecutive days, the average bite pressure was 142 pounds. The experiment was repeated with twenty female subjects, and it was found to be possible to increase the strength of the bite in women also by an assignment of mandibular exercise. They conclude that their experiment seems to indicate that the strength of the muscles of mastication is influenced by the amount of use to which they are put, up to a physiologic limit. In this respect, they do not appear to differ from muscles in any other part of the body. What significance this has for the soft tissues of the oral cavity, the development of the jaw bones or the health of the dental structures is not known, but the present experiment suggests the usefulness of further studies along this line.

Brekhus[6] has also said, in regard to the claim that chewing gum strengthens the jaw muscles and probably improves the general condition of the mouth: "So far as we have been able to observe, however, millions of dollars' worth of gum have been chewed in this country for a good many years without producing any strengthening of the jaws or improvement of dental conditions. Persistent gum chewers apparently have no stronger jaws and no better teeth than those who seldom or never chew gum." A search of the literature does not reveal the reports of any studies that contradict this statement of Brekhus.

The claim of chewing gum manufacturers that chewing gum helps to keep the teeth clean, while reasonable, is without any scientific basis of fact. In a recent booklet,[1] one manufacturer quotes a paper written by Bunting in 1917 in which chewing of a tough gum after each meal is recommended to insure the salivary flushing away of food débris. In response to a letter regarding his present views on this matter, Dr. Bunting replied:

> You remember that in 1917 we did not know as much about the effects of sweets or the relation of *L. acidophilus* as we know today. Furthermore, the statement as I intended it still stands, that is, a hard chewing gum—if it were devoid of sugar—would probably have some detergent effect. However, all of the gums that are commonly used are heavily loaded with sweets so far as I know. For that reason we have to tell our youngsters not to use gum.

Jensen[7] estimates that the average 1-cent piece of chewing gum contains approximately one-half teaspoon, or 2.5 gm. of sugar. The Council on Dental Therapeutics[8] has stated that there is no evidence deserving of the name that chewing gum gives the teeth exercise that modern foods cannot provide. It should be said here that Miner[2] also says: "Each day you should give your teeth plenty of chewing exercise. Raw fruits and vegetables, like carrots, apples, celery and the hearts of cabbage, are good chewy foods."

Forbes[9] has found that paraffin or gum chewing markedly increases the salivary neutralizing action, but it rapidly falls to the normal after chewing is stopped. Similar results were obtained whether the period of chewing was long or short. Hanke,[10] in a study of fifty-one persons, found a variation in the buffer values of saliva. He classified the patients into immune, non-susceptible and susceptible groups, comparing clinical findings with salivary analysis. The group secreting saliva with the highest buffer value or acid neutralizing power were found to be immune to dental caries; the group secreting saliva with a slightly lower buffer value were found to be non-susceptible, and the group secreting saliva with the lowest buffer value were found to be susceptible to dental caries. It is interesting to note that Hanke used chewing gum for inducing the flow of saliva in these experiments.

This study of Hanke's seems to indicate that the buffer value or acid neutralizing power of the saliva varies in different individuals and that it is dependent on conditions other than salivary stimulation. Wills[11] and Forbes confirm this view in a study in which stimulation of the salivary glands by means of various materials was found to give inconstant results. Accordingly, all samples were of basal saliva. It was found that when the subjects were placed on a diet high in protein and 5 per cent vegetables, the acid neutralizing power of the saliva was significantly higher than when the same persons were on a diet low in protein and 5 per cent vegetables and high in carbohydrates. In general, a single protein meal caused a rise. Their evidence suggested that these effects are systemic rather than local.

Knighton has conducted studies concerning the effect of chewing gum after meals on the incidence of lactobacilli in the mouths of children on a carbohydrate restricted diet. A group of children in an orphanage were divided as nearly equally as possible, according to control lactobacillus determinations and clinical examinations, into two sections. All of the children were placed on carbohydrate restricted diets for thirty-seven days. Children of one section were given a stick of chewing gum after each meal, except the meal just before salivary samples were to be taken. With this exception, all the children were treated the same. In the twelve children using chewing gum, there was a definite reduction in the lactobacillus counts of eight, while, in the eleven children not chewing gum, there was a reduction in the lactobacillus counts of six. The reduction of very high counts (10,000 per cubic centimeter or over) to zero included two cases in the chewing gum series and one case in the other series.

Knighton arrived at the following conclusions from these experiments: 1. The lactobacillus counts were reduced in more than 50 per cent of the individuals on a carbohydrate restricted diet. 2. The slightly greater percentage of reduced counts in cases of children chewing gum after meals was of little or no significance. 3. It is apparently possible to reduce the lactobacillus counts in some individuals from high counts to zero, even when they chew three sticks of gum a day. He believes that when a statement is made that lactobacillus counts cannot be reduced as long as a person chews gum, it should be modified by saying how much gum was necessary to prevent the reduction. These conclusions of Knighton need not be questioned. However, this study does not take into consideration the fact that many, if not most, individuals chew gum at times other than after meals. It should also be noted that this experiment was not conducted for a sufficient length of time to permit any observations regarding the difference, if any, in caries incidence in the children whose lactobacillus counts were not lowered. It would be interesting to learn whether the caries rate was higher or lower in those who chewed gum than in those whose counts remained high and who did not chew gum.

Hanke[12] has shown that a four-hour incubation of saliva, containing some sugar, may depress the pH to 4.5. It is interesting to note that the saliva was collected in the following manner: The patient chewed a piece of gum and expectorated the saliva into a sterile 30 cc. screw-cap jar until about 25 cc. had been collected. Further studies by Hanke have shown that a pH of from 4.2 to 4.4 is usually obtained when saliva, regardless of source (as long as it contains sugar), is incubated for six hours. It was evident to him, therefore, that the mixture of bacteria that can be found in any mouth (incubated with sugar) is capable of producing a degree of acidity sufficient to dissolve dental enamel completely.

Fosdick, Hansen and Epple[13] have de-

veloped a method of measuring chemically the susceptibility to dental caries.

It is not appropriate at this time to go into great detail about the chemical reactions involved in such a test. The flow of saliva is stimulated by chewing gum and a measured amount of saliva, which now contains sugar, is collected and to it is added a portion of ground tooth substance. After four hours at body temperature, the amount of decalcification resulting from the action of the saliva, i.e., bacteria in saliva present plus the sugar, is measured, and this determines the susceptibility of the patient.

The action of mouth bacteria and yeasts in saliva upon sugar in chewing gum as determined experimentally *in vitro* suggests that a similar action may take place in the oral cavity, particularly in susceptible individuals. Stephan[14] has shown that the pH of carious lesions may fall to low values after the introduction of sugars into the mouth.

Fancher and Fosdick[14] determined the lactic acid content of material from carious lesions before and after the ingestion of sugar. It was found that the lactic acid content increased from 50 to 200 per cent within ten minutes after the ingestion of sugar. Fosdick, commenting on these findings, says:

This work shows that in many cases lactic acid is formed in isolated areas of the mouth with extreme rapidity after the ingestion of sugar. This being the case—in order to protect the teeth it is necessary either to eliminate sugar from the diet of these patients or wash the sugar from the mouth before sufficient time for the production of lactic acid has elapsed.

The dissolution of enamel by the products of bacterial action upon sugar would necessarily occur before the sugar is dissipated from the chewing gum, probably in areas not bathed in saliva. The stimulation of the salivary glands by the chewing of gum after the sugar is lost would tend to neutralize any acid formed, provided, of course, the saliva reached the area where that acid is present.

The work of Teuscher and Fosdick[15] has shed some light on the retention of reducing sugars in the saliva after the mastication of chewing gum. Their study was made in an orphanage on eighty-five boys ranging in age from 11 to 18 years. One group was given caramel and chocolate candy; another, chewing gum; another, candy followed by gum, chewed for ten minutes. Two other groups were tested after the noon and evening meals, respectively. The noon meal consisted of hamburger and tomato gravy, mashed potatoes, sauerkraut, bread and butter, milk and gelatin. The evening meal consisted of fried potatoes, fried eggs and bacon, bread and butter, milk and white cake with chocolate frosting.

RATE OF DISAPPEARANCE OF REDUCING SUGAR FROM SALIVA

Time	10 Minutes	20 Minutes	30 Minutes	40 Minutes	50 Minutes	60 Minutes
Candy	+2.42	+1.16	+0.89	+0.64	+0.56	+0.03
Gum	+3.36	+1.29	+0.61	+0.26	+0.26	0.0
Candy-gum	+2.27	+0.36	+0.23	+0.14	0.0	0.0
Noon meal	+2.36	+1.27	+0.27	+0.14	0.0	0.0
Evening meal	+3.60	+1.25	+0.85	+0.40	+0.05	0.0

The accompanying table shows the arithmetic average of the rate of disappearance of reducing sugars from the saliva.

The authors say:

This table gives a comparison of the rates at which the sugar from the various foods or food combinations disappeared from the saliva. With all the foods tried there is a large amount of sugar in the first ten minute interval, which disappears at various rates depending on the food eaten. Candy is apparently retained longer than any of the other foods tried, with chewing gum showing a persistence of sugar slightly less than

that of candy. However, it was noted that with the candy-gum combination the sugar was removed more rapidly than when candy was eaten alone. In the latter test the candy was eaten and then gum was chewed for ten minutes. The stimulation of the saliva flow and the mechanical cleansing action of the gum probably accounts for the more rapid disappearance of the sugar in this instance.

Teuscher and Fosdick do not comment on the fact that, after thirty minutes, the values for the candy-gum combination and the noon meal are very similar. This meal is reasonably high in carbohydrates (starches), which can be converted to sugars by the action of ptyalin in the saliva, and yet the rate of disappearance is so similar that one can question the advisability of chewing gum after meals.

In the daily practice of general dentistry, it is very common to have patients enter the operating room, realize that they are chewing gum and ask where they can dispose of it. It is also a common experience to find chewing gum impacted in the interproximal space in excavating a cavity. The practice of chewing gum is a universal one and many patients who suffer from caries chew gum. However, the cases presented here are those in which most patients give a history of low refined carbohydrate intake, particularly of candies. So far as I can determine, an important etiologic factor in the production of caries in these cases was chewing gum containing sugars.

In citing case histories as evidence that chewing gum may be an etiologic factor in dental caries, it is realized that they may be challenged on the ground that they are presented without suitable controls. While controls in the strict sense of the word were not available, it happens that I have been making a study of individuals who are not susceptible to caries. If a patient has been free from dental caries for a period of two years he is questioned regarding his use of sweets and chewing gum. In a series of twenty-three non-susceptible persons, only two used chewing gum habitually. Both of these patients chewed two sticks of gum daily. All the others did not use gum or used gum only occasionally. These who chewed gum habitually did not have better dental health than those who did not chew gum.

My attention was first directed to the possibility that chewing gum may be an etiologic factor in dental caries by the case of a patient, a man aged 27. He had been under my care for seven years, and was of average susceptibility; that is, he developed one or two new cavities each year with the exception of the three-year period from 1934 to 1937, during which time he had no new cavities. In August 1939, he presented three gingivolingual cavities. In February 1940, he had developed a gingivobuccal cavity. At this time, he was questioned regarding his food habits generally, and particularly concerning his consumption of sweets. He stated that he had not consumed any more sweets than usual. In August 1940, he again presented himself for treatment. This time he had developed seven gingivobuccal and gingivolabial lesions, and this increase in caries was considered as surely due to some change in his habits. Upon questioning, it was learned that he was employed in an office where he was not permitted to smoke. To suppress the desire for smoking, he chewed gum. He did not chew gum after meals and chewed only two or three sticks a day. However, he chewed a half stick at a time, a practice which introduced sugar into his mouth at more frequent intervals than if he had chewed the same piece continuously. He was cautioned against using gum in this manner and advised to reduce his use of gum or to stop its use entirely if possible. He was seen again in April 1941. He had no new gingival caries, but there was a new cavity in an upper left lateral incisor.

In a series of patients aged 15, 25,[3] 27,[2] 29, 30, 40 and 40 and 45 with a history of habitual gum chewing, there were

fifty-five cavities found, forty-seven of which were gingival lesions, thirty-three labiogingival and buccogingival and twelve linguogingival. All opaque areas were not considered cavities, only teeth with dentin exposed as a result of the dissolution of the enamel being counted. All of these patients chewed gum habitually, many chewing a half a piece until the flavor was lost and then chewing a fresh piece.

While such a small number of cases does not warrant definite conclusions, it does seem to indicate that while chewing gum may have some detergent effect upon certain tooth surfaces, its habitual excessive use favors the formation of carious lesions on other tooth surfaces, particularly the gingival.

It seems fitting to point out here that the chewing gum manufacturers could have given the dental profession the results of a scientific study of the effects of chewing gum upon the teeth many years ago, if they had but asked disinterested dental investigators to study their employes. Driscoll,[16] in discussing his recent tour through a chewing gum factory, says:

> About a thousand persons are employed in this five story factory. Some of the workers chew gum as they work, many do not. I was told that new employees chew constantly. Some cease chewing while working after they have been in the plant a few weeks. A minority keeps up the steady chewing, as a rhythmic aid to steady motion.

It would be interesting to observe the state of dental health of these employes; to learn whether those who chew gum habitually enjoy better dental health than those those who do not chew gum.

SUMMARY

The work of Hanke and of Fosdick and Hansen seems to indicate that the use of chewing gum may be harmful so far as caries is concerned owing to its sugar content. The potential caries incidence from chewing gum should be greater in susceptible persons. Clinical observation supports this assumption.

Excessive habitual use of chewing gum appears to cause caries in some cases.

Persons free from caries who chew gum habitually do not appear to have healthier mouths than those who do not.

Chewing gum containing sugar is probably an unsafe dental therapeutic agent so far as caries is concerned.

BIBLIOGRAPHY

1. Systematic Masticatory Exertion. Part 1. American Chicle Co., New York, 1940.

2. MINER, L. M. S.: My Teeth. Good Teeth Council for Children, Chicago, 1940.

3. WIECKING, ANNA M.: *Northwest Dent.*, 19:103, April 1938.

4. RUSSELL, L. A., and BAYLES, T. B.: Temporomandibular Joint in Rheumatoid Arthritis. J.A.D.A., 28:537, April 1941.

5. BREKUS, P. J.; ARMSTRONG, W. D., and SIMON, W. J.: *J. D. Res.*, 20:87, April 1941.

6. BREKUS, P. J.: Your Teeth. Minneapolis: University of Minnesota Press, 1941.

7. JENSEN, A. L.: Is an Optimal Diet or a Low Carbohydrate Intake Required to Arrest Dental Decay? J.A.D.A., to be published.

8. Council on Dental Therapeutics. Beechnut Oralgene Chewing Gum Not Acceptable for A.D.R. J.A.D.A., 24:311, February 1937.

9. FORBES, J. C.: Effects of Meals, and Chewing of Paraffin and Gum on Acid Neutralizing Action of Saliva. *J. D. Res.*, 12:758, October 1932.

10. HANKE, M. T.: Buffer Value of Saliva and Its Relation to Dental Caries. *D. Digest*, 43:235, May 1937.

11. WILLS, J. H., and FORBES, J. C.: Dietary Effects upon Acid Neutralizing Power of Saliva. *J. D. Res.*, 18:409, October 1939.

12. HANKE, M. T.: Studies on Local Factors in Dental Caries. J.A.D.A., 27:1382, September 1940.

13. FOSDICK, L. S.; HANSEN, H. L., and EPPLE, CHARLOTTE: Enamel Decalcification by Mouth Organisms and Dental Caries. J.A.D.A., 24:1275, August 1937.

14. FANCHER, O. E., and FOSDICK, L. S.: Preliminary Report on Determination of Lactic Acid in Carious Material. *Northwest. Univ. Bull.*, 41:37, July 1941.

15. TEUSCHER, G. W., and FOSDICK, L. S.: Retention of Reducing Sugars in Saliva After Mastication of Carbohydrates. *Northwest. Univ. Bull.*, 21:17, February 1937.

16. DRISCOLL, C. B.: New York Day by Day. *Kansas City Times*, July 15, 1941.

Central Building.

THE NEED OF COOPERATION IN PROFESSIONAL FIELDS

By LEROY M. S. MINER, D.M.D., M.D., Dr. P.H., Boston, Mass.

THE founding of the dental school at Columbia University was an important event both for dental education and for the dental profession, and it is fitting that its twenty-five years of service should receive cordial recognition. It is an interesting fact that the biologic era in dentistry has also been in existence approximately twenty-five years. So we can celebrate tonight a double anniversary, with a deeper appreciation both of the dental school at Columbia and of the broader conceptions of dentistry which have developed along with it.

The Columbia University School of Dental and Oral Surgery was founded just as we were beginning to appreciate generally the relationship between the health of the mouth and the health of the body as a whole, and it is perhaps for this reason that there has always been at Columbia a lively interest in this aspect of the dental problem. The stirring events that have taken place here under the leadership of Deans Van Woert, Owre and Howe, and now under Deans Rappleye and Holliday, have constantly commanded my keen interest.

And so it is an honor to take part in this significant occasion, and I am happy to have this opportunity to express my conviction that dental education in this great university will move forward steadily and unerringly, and that its opportunity for a leadership that can be cordially accepted by the other dental schools of the country will be developed with increasing effectiveness. May I wish for both Dean Rappleye and Dean Holliday the inspiration which comes from realization of this great opportunity which lies before each of them.

The subject on which I have chosen to speak this evening is "The Need of Cooperation in Professional Fields."

In discussing this subject at a meeting in Chicago some years ago, I stressed the importance to medicine and dentistry of understanding each other's language. It was suggested by one of my friends on the Council on Dental Education that I repeat a story which I told at that time of the Polish horse. The story goes like this:

Several years ago, I had occasion to purchase a horse for use on a farm that I have in southern New Hampshire. A splendid black young animal was recommended to me, and because the owner felt sure of the inherent worth of the horse, he agreed that if I would purchase it, he would take it back if it was not satisfactory. After the horse had been on the farm two weeks, the man who was using him told me that the horse was no good and he thought that we had better return him. I asked what the trouble was and he said, "The horse does not seem to understand what I want. He doesn't whoa when I say 'whoa'; he doesn't back up when I say 'back up'; he doesn't giddap when I say 'giddap'; I can do nothing with him." And so I went back to the man from whom I had bought the horse and told him the difficulty. He thought it was rather curious

Read at the Twenty-Fifth Anniversary of the School of Dental and Oral Surgery, Columbia University, January 17, 1942.

that we should have trouble, and then suddenly a smile came over his face and he said, "I think I know the reason for the difficulty—the horse doesn't understand English. He has been used for the last three years by a Pole, who has talked to him entirely in Polish." We then faced the problem of whether it would be easier to teach the horse English or the man on the place Polish, but I finally decided that, in order to get full cooperation, we would do both. We would teach the horse English, and while the horse was learning English, we would have the man learn Polish and talk to the horse in that language. This worked out beautifully. There was complete cooperation between the man and the horse and we had no trouble from that time on. Each knew the other's language.

The dramatic conference of the Atlantic, and the recent visit of Mr. Churchill at the White House, set an unprecedented example of cooperation in action to the nations of the world. The pattern of cooperative effort drawn by the President of the United States and the Prime Minister of Britain is applicable not only to international problems, but also to problems in our own social structure, and especially in our educational institutions.

The need for cooperation between the United States and Great Britain was conditioned by the fact, first, that the two nations have a common enemy who is threatening their existence and whom it is necessary to subdue. Second, these nations have a common objective—the welfare of the people. Third, they have a common philosophy of government of the people, for the people and by the people, carrying with it all the rights of free men.

That the agreements between these nations would really work successfully was indicated by the soundness of their provisions. These agreements did not involve any loss by either nation of independent action in their domestic affairs, and they stood on equal footing, with an equal voice in the conduct of their common affairs. Neither was subordinated or dominated by the other. In other words, to use an expression frequently heard of late in dental circles, there was no loss whatever of autonomy. Because of the real need of money and materials by Britain, the United States, the more favored nation at the moment, agreed to provide these necessities. The benefits would, of course, accrue primarily to Britain, but they would accrue indirectly, and even perhaps directly, to the United States as well. By these procedures, victory is assured.

The parallel between these problems of nations and the problems of the professions is striking. The need of cooperation between different fields of science is quite apparent, and nowhere is it more imperative than between medical and dental education and medical and dental practice. Britain and the United States have a common enemy and so have medicine and dentistry, that common enemy for the health professions being disease, and both professions are under obligation to subdue it. The diseases that primarily concern medicine also concern the dentist, for some of them give rise to symptoms within the mouth. Dental disease, particularly dental caries, on the other hand, has been clearly shown to be a problem not only for the dentist, but equally for the physician, and also for the biochemist, the physiologist, the pathologist, the geneticist and the expert in the field of nutrition. Disease, then, a common enemy, equally concerns medicine and dentistry.

Medicine and dentistry also have a common objective—the health and well-being of the people; and here again, in order that this objective may be realized, not only in the civilian population, but now in the armed forces also, cooperation is absolutely necessary.

A common enemy and a common ob-

jective should be sufficient reason for effective cooperative effort. A side-by-side attack on common problems would appear to be the most natural and logical thing in the world. Unfortunately, this has not been the case. For a hundred years—since the founding of the first dental school—the integration of medicine and dentistry has been constantly discussed. There has been much talk—talk which unfortunately has resulted in little or no constructive action.

Medicine has been criticized for its indifference, even its hostility, toward dentistry; for its superiority complex and its refusals to lend a helping hand in attempts to solve some of the dental problems which, at least indirectly, are of concern to medicine. Much of this criticism is well deserved. Medicine has much to answer for in its treatment of dentistry. It is nothing short of tragic when a young physician, already showing great promise by his work in this very university, after accepting a post in another university to develop a research program in dental medicine complains to a friend that his standing and prestige as a physician are suffering because he is connected with dental affairs.

It would, however, be unfair to lay the blame for lack of cooperation wholly on medicine. Dentistry is equally at fault, it too having many shortcomings.

As a historical fact, dentistry missed an unusual opportunity extended to it by medicine many years ago. Fifty-five years ago, to be exact, medicine indicated its eagerness to cooperate with dentistry and established a very simple but effective formula which could be made to work today.

In 1887, the House of Delegates of the American Medical Association passed a resolution by which graduates in dentistry, under what appeared to be entirely logical conditions, were recognized as practitioners of medicine and admitted to membership in that organization. The resolution reads as follows:

Resolved: That the regular graduates of such dental and oral schools and colleges as require of their students a standard of preliminary or general education, and a term of professional study equal to the best class of the medical colleges of this country; and embrace in their curriculum all the fundamental branches of medicine, differing chiefly by substituting practical and clinical instruction in dental and oral medicine and surgery, in place of practical and clinical instruction in general medicine and surgery, be recognized as members of the regular profession of medicine, and eligible to membership in this association on the same conditions and subject to the same regulations as other members.*

The resolution was introduced with the explanation that dentistry, as it was then conceived, was a part of the profession of medicine, and as much so as ophthalmology, otology and the like. It was indicative of a willingness to waive technical distinctions in the interest of a solution of the common problems of medicine and dentistry as they were seen at that time.

Here was cooperation to the full, on the basis of equality and mutual respect —the same type of cooperation as is seen between the United States and Britain. There was no hint of domination, one of the other, no absorption or loss of identity.

Dentistry did not, in fact could not, take advantage, to any extent, of this action by the American Medical Association. Had the dental schools at that time immediately adopted a plan of education which would have enabled their graduates to qualify for membership in the American Medical Association, the development of dentistry and dental education would have been very different during these fifty-five years. Whether dentistry is better or worse off is a matter for debate. So far as we have been able to determine, this resolution has never been repealed, and might still be applicable.

*J.A.M.A., 8:722, 1887.

With the need for cooperation between medicine and dentistry so apparent, what pattern can be drawn to make this a fact and not simply a matter for discussion?

First of all, it seems necessary that plans must be based on the idea that the two professions stand on an equal footing, with equal voice in the conduct of their common problems. Dentistry now has a national organization of 50,000 members, and many national organizations of special divisions of the profession, thirty-nine dental schools and fifty dental practice laws. It is unlikely, from a practical point of view, that dentistry will be absorbed by medicine and become an inherent part of that profession.

Medicine and dentistry can work cooperatively as equals probably through a reasonable equality of educational preparation to meet the problems that face both professions. The formula established by the House of Delegates of the American Medical Association, fifty-five years ago, still appears to be sound.

A recent book, "Dental Education in the United States," proposes a modification of the dental course that completely fulfils the provisions of the American Medical Association resolution. The suggestions are as follows:

1. The admission requirements to the study of dentistry shall be equal to those prescribed for admission to a good medical school.

2. The basic-science courses of the dental curriculum shall be qualitatively and quantitatively equal to those of the medical curriculum.

3. The dental student shall be provided with greater opportunity for training in certain appropriate phases of clinical medicine.

4. The disciplines of the dental and medical courses shall be interchangeable, so that it may be possible for the dental graduate to earn the degree in medicine and the medical graduate the degree in dentistry in at least two additional years.

5. As a supplement to these proposals, closer and more effective coordination of dental and medical education also shall be promoted by providing opportunities for the medical student to acquire knowledge of the normal oral tissues, oral pathology and oral diagnosis.

For full cooperation, it would naturally be necessary for the medical students to have some training in oral pathology and oral diagnosis.

Acceleration of this cooperative program may come sooner than we think. World War I did much to bring dentistry and medicine closer together, and the present war may bring about still closer cooperation.

It is perhaps futile to attempt to look too far into the future, but we can agree with the sentiment expressed by the Secretary of the American Dental Association, Harry B. Pinney, in a short but eloquent speech in Baltimore on the one-hundredth anniversary of the founding of the first dental school. He said, "Let us take off our hats to the past. Let us take off our coats to the future."

But as we take off our coats and work as never before, our work will have more zest, more inspiration, if we have before our eyes an ideal to work for, and if we can visualize our objectives. This idea is beautifully expressed in a poem by Helen W. Richardson, published in the current issue of one of our national magazines, and I will close by reading it.

MASTER MASON

By HELEN W. RICHARDSON*

"What are you doing, friend?" I asked of one,
And he, while spreading on the mortar thick,
Eyed me with a look of mild surprise
And answered simply, "I am laying brick."

Another one I watched, and questioned him,

"What is this that you do with tireless speed?"
His skillful hands worked on without a pause,
"I have a wife and little ones to feed."

Then to a third my query still I brought.
With trowel poised, he slowly raised his head,
A glorious vision shining in his eyes.
"I'm building a cathedral, sir," he said.

---

*From the *Saturday Evening Post*, copyright 1942, by the Curtis Publishing Company.

EFFECTS OF THE BARBITURATES

By JOHN C. GABLE, D.D.S., Woodward, Iowa

THE barbiturates have been used for their sedative effect in the mental institutions of this country and by the private practitioner for many years, but, until very recently, no attention had been paid to either the local or the general effects of the drug. Yet there is not an institution, so far as I can learn, that has not had great numbers of patients suffering from hypertrophic gingivitis, the cause being attributed to lack of cleanliness of the mouth. The same was true of the patients of the private practitioner.

When I became a member of the dental staff of the Iowa Hospital for Epileptics and School for Feebleminded, hundreds of the patients were being treated for so-called trench mouth. The usual remedies, chromic acid and hydrogen peroxide, a solution in dilution with hydrogen peroxide of potassium arsenite (Fowler's), gentian violet, bismuth, locally, and, later, the ultraviolet rays, were used, but the tumefaction persisted.

Bismuth was tried, both locally and hypodermically, and it was decided that the condition was not caused by the spirochete alone. Thorough prophylaxis was applied in all afflicted cases and gingivectomy performed, with the result that much improvement was noted. Wherever exodontia was indicated, the teeth were extracted.

In many cases, the gingival tissue had covered the greater part of the crowns of the teeth, usually not farther back than the second bicuspids, sometimes on the upper, again on the lower teeth, but often on both.

It was noted that the condition was confined to patients who were being given either phenobarbital or dilantin, or both.

From correspondence with others, I gained much information. From R. L. Bantz, D.D.S., of Missouri State School at Marshall, I received the following:

> I have been connected with the institution for about fourteen years, during which time I have seen lots of phenobarbital used. We use very little dilantin, so, know very little about it. Our patients taking the phenobarbital over a long period of time are nearly all afflicted with gingivitis, and their gums have a bluish color, but never have I noticed that they were any more susceptible to Vincent's than any other patients.

I was told by the representative of one pharmaceutic house that the gums of 2 per cent of the patients taking dilantin showed gingivitis.

Taking the matter up with the Department of Pharmacology of the Med-

ical Department of Iowa State University, I received this reply:

I have had no personal experience with dilantin. The claim of 2 per cent of hyperplasia of the gums is too low. Kimball and Horan, in 1939, reported that about 50 per cent of their cases showed hyperplasia. Franklin reported thirty out of forty-eight cases, while Merritt and Putnam report that only 6 per cent of their cases showed gum changes. I am interested in your observation that the gum changes occur more frequently after barbiturates.

Modern Medicine, August 1941, has the following:

At the meeting of the American Psychiatric Association in Richmond, it was stated: "Dilantin, the drug that proved an effective remedy in epilepsy, nevertheless caused weight loss and decrease in blood protein in adult patients, it was announced by Drs. Felix Frisch and Albert W. Pigett of Skillman, New Jersey. With the use of dilantin, the number of seizures in epileptic patients was reduced from an average of thirteen a month to one a month, but, at the same time, the body weight was reduced from an average of 174 pounds to 153 pounds. Decrease of blood protein, during treatment, it was pointed out, has a rather unfavorable, and by no means different, effect.

Veterinarians have informed me that hyperplasia of the gums of small animals upon which the barbiturates have been used is common.

A survey of 718 patients who were receiving the barbiturates between January 1, 1941, and August 1, 1941, revealed that 39 per cent had lost weight, while 35 per cent showed hyperplasia of the gums. As many of the patients were edentulous, it was not possible to learn the effect, if any, upon the oral tissues of those receiving the treatment. The white blood count was normal; some patients showing a slight increase, others a slight decrease, while the polymorphonuclear count was normal.

Our patients receive plenty of tomato juice daily, but there is no evidence that it has any immediate effect upon this class of patients.

The treatment here consists of thorough brushing twice daily, with gingivectomy when indicated, incising along the line of demarcation, with a B-P pointed bistoury No. 11. After hemorrhage has ceased, the gums are painted with a saturated solution of tannic acid in glycerine, followed immediately with a 5 per cent solution of chromic acid. The patients are seen daily, for three return visits. Any islets of hypertrophy are touched with carbolic acid and the tannic-chromic acid treatment is repeated.

In many cases, this treatment suffices, but a few recur. Thorough prophylaxis at the chair, followed by brushing twice daily, is carefully followed. However, cleanliness is not a sure preventive. Many patients have been given the best dental care, but their gums show the effects of former treatment with the barbiturates.

Nothing has been brought out as yet that will counteract the effects of the drug. Local treatment is only palliative.

RELATION OF FATAL SUBACUTE BACTERIAL ENDOCARDITIS TO TOOTH EXTRACTION

By Arthur J. Geiger, M.D., New Haven, Conn.

SUBACUTE bacterial endocarditis is an almost invariably fatal disease in which the physician and the dentist not infrequently play a causative rôle. It is a condition in which pathogenic bacteria, having gained access to the blood stream, apparently become implanted and proceed to multiply at some favorable site in the cardiovascular system. The principal lesion of the disease is a thrombotic bacterial mass, usually growing on a heart valve that has been previously damaged by disease, such as rheumatic fever or syphilis. The systemic manifestations of the ailment are due chiefly to a toxemia induced by the bacteria, and to infective emboli that may break periodically from the original vegetative mass and become lodged almost anywhere in the body.

The clinical picture is that of a febrile illness with progressive deterioration in health, the development of anemia and the sudden appearance of complications when emboli drift into and occlude the arteries of vital organs such as the brain and kidney. The offending organisms, most commonly *Streptococcus viridans,* usually can be cultivated from the blood. The course of the disease is relentlessly toward death, which follows most often from exhaustion or failure of the heart or kidneys within a few months in spite of our best therapeutic efforts.

The brief history of an actual case follows:

Read before the Connecticut State Dental Association, New Haven, Conn., November 12, 1941.

From the Department of Internal Medicine, Yale University School of Medicine.

REPORT OF CASE

The patient had had acute rheumatic fever in his eighth, twenty-fourth and twenty-seventh years, which left him with a damaged heart, but no symptoms of disability. He supported his family by working as a mechanic until his thirty-fourth year, when his fatal illness occurred. In 1937, he had several badly carious teeth extracted without apparent ill effects. In May 1939, two more teeth were removed, and, about a week later, there appeared the first of a train of symptoms marking the illness which finally caused the death of the patient.

The symptoms, in the order of their development, were chronic fatigue, periodic palpitation of the heart, with breathlessness, progressive weight loss in excess of 20 pounds in three months, night sweats and feverishness. When the patient was admitted to the hospital in August 1937, he was pale and thin. The physical signs of enlargement of the heart, with deformity and narrowing of the aortic and mitral valve orifices, were obvious. Study in the hospital revealed irregular fever and progressive anemia, and cultures of the blood showed *Streptococcus viridans.*

In spite of energetic chemotherapy with sulfanilamide and with sulfathiazole, the organisms persisted in the blood stream, bacterial emboli appeared in the extremities and kidneys and the clinical condition progressed from bad to worse, culminating, as usual, in death after an illness of four months. Postmortem examination by Henry Bunting showed the typical features of subacute bacterial endocarditis with thrombotic vegetations containing clumps of *Streptococcus viridans* on the injured heart valves, and infarcts from embolization in several organs. Periapical abscesses were found around several of the remaining teeth, and *Streptococcus viridans* was cultured from these foci as well as from the root canals.

That the case just cited is a probable example of subacute bacterial endocarditis initiated by the extraction of teeth would appear clear from the history that ill health began very shortly after the dental procedure, and that other periapical abscesses harboring the incriminating organism were found at necropsy. This is not a rare and isolated instance of such an association. In fifty proved cases of this disease drawn at random from the history files of the New Haven Hospital, the symptomatic beginning of the fatal infection was specifically mentioned in twelve instances as closely following extractions. In five others, the suspicion of invasion from a dental focus was suggested by the physician's notation of "recent dental work" in one, "abscessed teeth" in another, "extensive pyorrhea" in a third, and "miserable condition of teeth" in two others. Impressive as these figures are, they may well fall short of the whole truth, for, in many of the case histories, there was no statement concerning the teeth or recent extractions, and perhaps specific inquiry concerning this detail was overlooked.

The seeding of the blood stream with bacteria occurring in the periapical region and in the gingival crevice appears to follow from the trauma and other forces exerted unavoidably in extracting a tooth.

That bacteremia actually occurs under these circumstances has been repeatedly demonstrated. Lester W. Burket and Caspar Burn, working in the Department of Pathology under the guidance of the Yale Dental Study Unit, have not only confirmed the fact that bacteremia frequently follows tooth extraction, but also showed that even vigorous gingival massage in patients with pyorrheal disease was effective in producing a transient bacteremia. Moreover, Burket and Burn showed clearly that the organisms recovered from the blood actually originated in the periodontal tissues. This significant demonstration was ingeniously accomplished by painting the gingival margin with a suspension of a nonpathogenic bacterium *(Serrata marcesens)* just prior to extraction of a tooth. This foreign bacterium was frequently recovered from the blood ten minutes after removal of the tooth under local anesthesia. There is considerable evidence, therefore, that bacteria are forced into the blood stream by the manipulations involved in tooth extraction.

It is important to note that the bacteremia observed by Burket and Burn and by others was quite transient, usually disappearing within an hour. In all probability, such periodic assaults by a small invading force occur frequently in ordinary life, but are easily withstood by the defenses of the body, which destroy and excrete the invaders before they obtain a foothold in the normal cardiovascular system. But the presence of a diseased valve or abnormal endothelial lining on the walls of the heart or great vessels appears to offer a highly favorable ground for the permanent lodgment and growth of bacteria, and, in subjects with such cardiovascular lesions, an otherwise transient and innocuous bacteremia can take a disastrous turn.

The important practical question for both dentists and physicians is what may be done to prevent this fatal complication. Certainly the dentist cannot be expected to exclude the presence of heart disease before extracting a tooth in all his patients. And even subjects with known heart lesions must on occasion have teeth removed. Perhaps the prevention of subacute bacterial endocarditis as a complication of tooth extraction might be achieved along the following lines:

1. The indiscriminate extraction of teeth without clear indications should be condemned.

2. The extraction of abscessed teeth should not be undertaken without some assurance that the patient is free from cardiovascular defects, particularly valvular disease.

3. If it is essential to extract a tooth in the presence of a known periapical abscess or obvious disease of the gingival crevice, it would seem desirable first to treat the gingival infection or to drain the abscess and to remove the tooth at some later and presumably safer time.

4. Finally, an effort at prophylactic chemotherapy might be made by the administration of a drug, such as sulfadiazine, for a day or two before and for several days after dental extraction in a cardiac subject. This procedure is being followed now with cardiac patients in the New Haven Hospital and Dispensary in cooperation with the Yale Dental Study Unit. While it is acknowledged that none of the sulfonamide drugs at present available are actively bactericidal to *Streptococcus viridans*, it is hoped that such bacteriostatic effects as they possess may prove sufficient to enable the body's natural defense mechanisms to dispose effectively of the bacteremia. Time may yield the answer.

SPACE MAINTAINERS

By HENRY E. COLBY, D.D.S.; WILLIAM J. SIMON, D.D.S., and HAROLD C. WITTICH, D.D.S., Minneapolis, Minn.

THE relative embarrassment in the maintenance of space in the mixed dentition of young patients has opened a prodigious field of endeavor for that specialty of the dental science known as children's dentistry. However, the commutation of the mixed dentition has effected an abrupt exchange of thought as to what constitutes children's dentistry, with the result that the scope of children's dentistry has been limited by chronologic age. This has proved a mare's nest, for, ultimately, through accident or negligence, there presents the occasional case necessitating a space maintainer which falls outside the increment of chronologic age allotted to children's dentistry. These unfortunate children range in age from 12 to 18 years.

From an orthodontic aspect, it is imperative, in the majority of these cases, that the space caused by the loss of any segment of the arch be retained until the erupting individual teeth have attained stature sufficient to warrant fixed replacements without jeopardizing the health of vital pulps. The temporary appliance for this type of case is often referred to as a "space retainer"[2, 3] although the term "space maintainer"[4, 5] can scarcely be considered a malapropism.

The question often arises as to whether or not this temporary appliance should be constructed as a fixed or removable prosthetic appliance. At the University of Minnesota, the fixed appliance has been favored because:

1. The majority of removable prosthetic appliances depend upon tensofriction for their retention. Because of the growth changes occurring in the mouths of these youngsters[6] the removable type of appliance is very likely to restrict development or disturb the normal physiologic eruption process.

2. It is a fairly well-accepted fact that teeth which are clasped are subject to stresses greater than those of normal function. If it is not possible to construct

From the University of Minnesota, School of Dentistry.

a fixed space maintainer, a partial denture is the solution.

3. Unfortunately, some of these children are not of sufficient mental development[7] to realize the necessity of wearing a removable appliance continuously, with the result that the proximate teeth drift, causing a loss of space needed for a satisfactory replacement later in life.

4. The hyperemic congestion that occurs in some mouths, following the insertion of a removable space maintainer is occasionally severe enough to contraindicate this type of appliance.

5. Occasionally, a removable space maintainer produces a speech impediment, which may cause a psychologic disturbance.

Fig. 1.—Space maintainer constructed with bands.

6. Children misplace or lose many of their belongings.

7. The argument that one type of appliance is more hygienic and less friable than the other is a matter of opinion. The strength of either type of space maintainer depends on the construction. Cleanliness is a problem of home training often beyond the jurisdiction of the dentist.

8. The esthetic qualities of the fixed as well as the removable space maintainer are well recognized, especially in an anterior replacement. Appearance means a great deal to these "teen age" children[8] and often is a factor in personality and temperament.

With the foregoing advantages in mind, together with the desire to perform the most satisfactory and lasting services for these adult patients of tomorrow, we present several clinic cases in which fixed space maintainers were chosen in replacements.

Figure 1 illustrates a space maintainer in a boy 14 years of age. A tooth was knocked out during football scrimmage. As is evident in the illustration, the boy did not seek help until his parents noted drifting.[9] The appliance was employed as a temporary device pending financial arrangements for orthodontic treatment.

The construction of these appliances is simple. Individual modeling compound impressions are taken of the abutment teeth. At the same sitting, sectional compound impressions of the upper and lower arches are also taken. Dies of amalgam for the abutment teeth are placed in the sectional compound impression and the casts are poured. The separated casts and dies appear as illustrated in Figure 2.

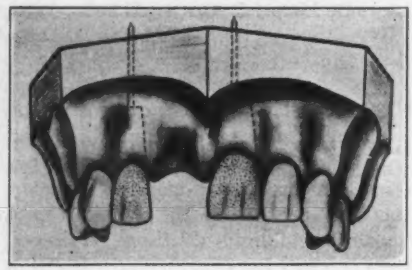


Fig. 2.—Poured cast with dies in position.

The bands are made on the dies from any rigid orthodontic banding material of precious metal. Stainless steel can be used if equipment for welding is available.

The band is contoured and soldered on the lingual surface. (Fig. 3.) After the band is soldered, the excess material on the lingual surface is removed to prevent interference with the occlusion.

Following the checking of the articulation, the band is so trimmed that, when viewed from the mesial, distal and lingual aspects, it appears as in Figure 4.

A relationship impression of the bands in the mouth is taken and the space maintainer is completed in much the same manner as a fixed bridge. Steele's facings or pin facings may be used. These maintainers are cemented to place with zinc-silicate cements. They should be removed annually for thorough inspection and recementation.

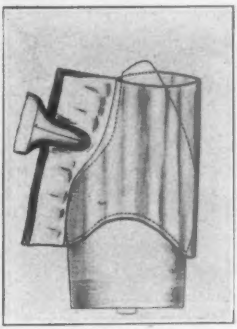


Fig. 3.—Band contoured and soldered on lingual surface.

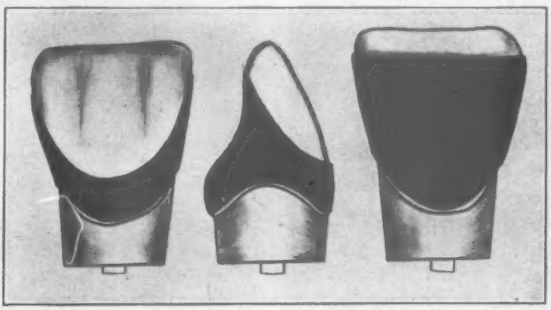


Fig. 4.—Three aspects of finished band.

Figure 5 illustrates a space maintainer in a girl 13 years of age who met with a bicycle accident. One of these central incisors was completely displaced from its socket and the incisal angle of the crown of the other was fractured. The fractured central incisor remained vital for several weeks after the accident.

The modification in construction of this space maintainer is illustrated in Figure 6. The lingual portion of the band is extended to the incisal edge of the fractured tooth creating a crypt in which a silicate window can be placed after cementation. This type of band can also be used advantageously when individual teeth are involved.

Fig. 5.—Space maintainer constructed on bands in which mesio-incisal angle of one of abutments has been fractured.

Figure 7 is a photograph of a girl 12 years of age who has a space maintainer extending from the canine to the central incisor. The central incisor and the lateral incisor were removed in this case because of a fistulous abscessed condition about the apices. A question arose as to whether this case called for a fixed or a removable appliance. It was thought that

by using an open-faced crown (Fig. 8) sufficient rigidity could be obtained to withstand the stresses of mastication. The space maintainer here has functioned for a little more than one year thus far, without mishap.

Not all of the space maintainers made at the University of Minnesota, School of Dentistry, are constructed on bands. Figure 9 illustrates a space maintainer constructed on modified cast three-quarter

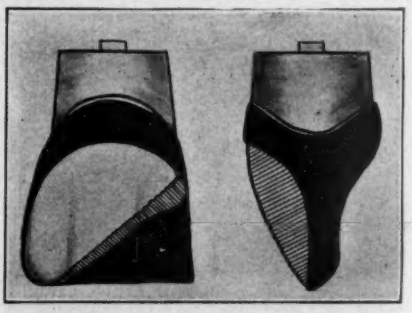


Fig. 6.—Band prepared so that crypt is found in which silicate filling can be placed.

Fig. 7.—Space maintainer using open-faced crown for abutment.

crowns for a boy 10 years of age, who had been hit with a rock. The modified three-quarter crown preparation is made by passing a carborundum disk through the contacts so that the finished planes converge slightly labially, as shown in Figure 10. These cuts lock the crown so that it cannot be displaced lingually. The labio-incisal edge is also beveled, as illustrated in Figure 11, to prevent displacement. Shallow resistance grooves may be made on the proximal surfaces for additional resistance. These preparations can be made so as not to involve the dentin at any point, although in Figure 9 the incisal bevel appears to be excessive.

The mechanics of this type of space

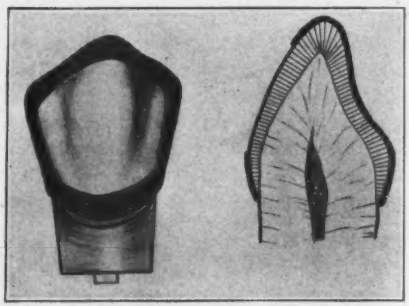


Fig. 8.—Adaptation of open-faced crown.

Fig. 9.—Space maintainer using cast veneer crowns for abutments.

maintainer involves some of the fundamental principles of crown and bridge construction and yields the most esthetic type of replacement. However, the teaching staff of the University of Minnesota, School of Dentistry, prefers to familiarize the student with the band abutment technic as described in

Figure 1 upon his introduction to the work.

Figure 12 illustrates a space maintainer for a boy 13 years of age, who lost one central incisor and the crown of the other while playing hockey. The remaining root was immediately devitalized and a Richmond crown was constructed. To this crown, a facing was soldered, completing the appliance. (Fig. 13.) This space maintainer is not removed annually for recementation. However, each year roentgenograms are taken of the abutment tooth, and no pathologic condition has been noted to date.

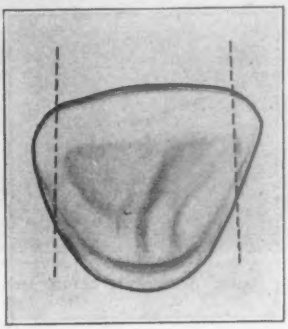


Fig. 10.—Part of tooth removed by carborundum disk so that finished plane surfaces converge slightly labially.

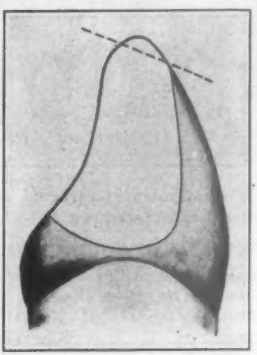


Fig. 11.—Part of incisal edge removed by beveling in order to prevent displacement.

Figure 14 is a "before and after" picture of a porcelain crown used as a space maintainer of normal contacts in the anterior portion of the mouth.

This abutment tooth presented a carious area with considerable destruction of tooth structure. After treatment of the root canal, a post inlay was prepared for the reception of the porcelain crown.

Fig. 12.—Space maintainer constructed on Richmond crown.

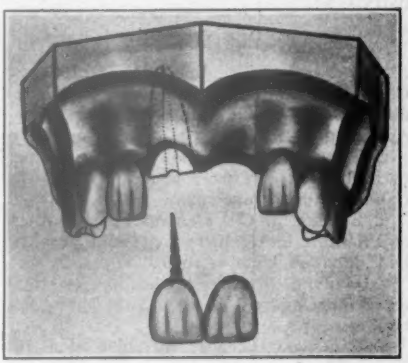


Fig. 13.—Cast on which Richmond crown space maintainer was constructed.

(Fig. 15.) The patient, a girl aged 15, realizes that it is a very delicate restoration, but is appreciative of the appearance of the crown. A cast three-quarter crown with a silicate window could have been made in this case also. However, factors over which we have no control

often limit one as to the construction of this type of space maintainer.

The clinic cases described are examples of the efforts of the students of the University of Minnesota, School of Dentistry, to perform satisfactory service for these young people. The importance of maintaining space in these cases should be recognized by every practitioner of dentistry.

Fig. 14.—Use of porcelain jacket crown to maintain space. Left, case before treatment. Right, case after treatment.

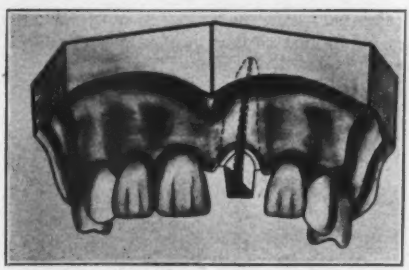


Fig. 15.—Post inlay constructed for abutment of porcelain jacket crown.

BIBLIOGRAPHY

1. KNUTSON, J. W.; KLEIN, H., and PALMER, C. E.: Dental Needs of Grade School Children of Hagerstown, Md. J.A.D.A., 27:579, April 1940.

2. TOVERUD, P. G.: Simple Space Retainer in Early Loss of First Deciduous Molar. *D. Cosmos*, 71:613, June 1929.

3. BRAUER, J. C.: General Considerations of Problems in Dentistry for Children. J.A.D.A., 25:1640, October 1938.

4. MARTIN, MARY: Application of Dentistry for Children. J.A.D.A., 24:1821, November 1937.

5. CALLAWAY, G. S.: Contraindications for Space Maintainers in Mouths of Children. J.A.D.A., 27:1091, July 1940.

6. COHEN, J. T.: Growth and Development of Dental Arches in Children. J.A.D.A., 27: 1250, August 1940.

7. LAMONS, F. F.: Psychology and Children's Dental Practice. J.A.D.A., 25:553, April 1938.

8. MCBRIDE, W. C.: Treatment of Accidents to Anterior Teeth of Young Patients. J.A.D.A., 23:755, May 1936.

9. LEHMAN, I. A.: Orthodontic Problems Which Involve Operative Dentist. J.A.D.A., 26:1618, October 1939.

10. HOGEBOOM, F. E.: New Technical Adaptations in Practice of Dentistry for Children. J.A.D.A., 27:64, January 1940.

THE JOURNAL *of the*
AMERICAN DENTAL ASSOCIATION

L. PIERCE ANTHONY, D.D.S., Editor

Published by the American Dental Association
212 East Superior St., Chicago, Ill.

All expressions of opinions and all statements of supposed facts are published on the authority of the writer over whose signature they appear, and are not to be regarded as expressing the views of the American Dental Association, unless such statements or opinions have been adopted by the Association.

Communications intended for publication in the scientific or literary pages of THE JOURNAL should be addressed to the Editor. All advertising or business matter should be sent to the Business Manager.

Subscription is included in the annual membership dues. The subscription rate to non-members is $5.00 a year in advance, this rate applying to both domestic and foreign subscriptions. All foreign subscriptions are to be paid in United States money.

THE USE OF THE SULFONAMIDE COMPOUNDS IN DENTISTRY

THE comparatively recent discovery of the therapeutic value of sulfonamide compounds has been of such importance to medicine and dentistry that it has been hailed as the most dramatic and momentous event in medical history. While still in the experimental stage of development, several compounds of sulfonamide have been accepted in the therapeutic field and have been applied in the treatment of millions of persons suffering from many and varied diseases.

The introduction of these compounds into the general field of therapeutics has been an event of great importance and concern in the field of dentistry, particularly because of their applicability to the treatment of infectious disease of dental origin and disease involving the oral tissues.

The manner of introduction of these drugs was so spectacular that medicine was swept off its feet, as it were, and the panacea seekers began the exploitation of sulfanilamide with even greater enthusiasm than they had been accustomed to exhibit toward previous promising panaceas.

From the earliest efforts to develop and exploit the therapeutic possibilities of the sulfonamide compounds, the Council on Dental Thera-

peutics of the American Dental Association has concerned itself with the dental therapeutic possibilities of these compounds. In the present issue, we are publishing in the department devoted to the activities of the Council a comprehensive study of the "Local Use of Sulfonamides" by F. D. Ostrander, D.D.S., M.S., and F. W. Hartman, M.S., of the University of Michigan School of Dentistry, a notable contribution to the therapeutic evaluation of the sulfonamide compounds in their application to dental disease. The Council has discreetly confined its investigation of these drugs strictly to the dental therapeutic aspect and here sponsors an excellent article on the local application of the three compounds which lend themselves to dental surgical therapy: sulfanilamide, sulfapyridine and sulfathiazole.

The therapeutic value of the sulfonamide compounds rests in their bacteriostatic power, and although the extent of their bactericidal power is still in question, their action is such that bacteria are rendered inert and thus the biologic mechanisms of the body are enabled to deal more effectively with the infecting agent.

The first use of a sulfonamide compound was that of prontosil in the treatment of skin infections, and the favorable result of its action in many intractable skin diseases led to experimental use of the sulfonamide compounds in systemic infections. Its inhibitory action on the streptococcus appealed particularly to the dentist for the reason that the most serious systemic conditions resulting from mouth infections are those in which the streptococcus type of bacteria, particularly *Streptococcus viridans,* is involved. And although the experimental work done in dentistry indicates varying and varied results from the use of these drugs, the fact has been well established that application of the sulfonamide compound sulfathiazole to extraction wounds has greatly reduced the infection hazard following removal of teeth. So-called dry socket has long been a serious problem in dental surgical procedures, and the promise which experimental dental research offers toward elimination or avoidance of this condition is indeed encouraging.

There are many other pathologic dental conditions in which the sulfonamide compounds have proved of value: dry socket, tooth extraction, pain following surgical treatment of pyorrhea, osteomyelitis, aphthous stomatitis, alveolectomy (after-treatment), fracture and cellulitis. They are also a prophylactic in the presence of heart lesions when extraction is necessary and against possible flare-up of an old infection. Undoubtedly, further experimental studies will prove the therapeutic value of these compounds in numerous other dental conditions.

The mode of action of the sulfonamides on bacteria remains an open question. Opinions on the details of this process are numerous and divergent. It is generally agreed that the action *in vitro* of the various derivatives may vary from slight bacteriostasis to some degree of bactericidal activity, depending on a host of variable experimental conditions.

Attention has repeatedly been directed to the blood changes that occur during sulfonamide therapy. Many new types of reactions have been reported periodically, but the relative frequency and significance of the blood reactions remain unsettled. For instance, it is of utmost importance that the physician know at what time during treatment these reactions appear; how long during and after treatment the blood count must be checked; what group of patients are most likely to be affected, and which sulfonamide compound is most apt to produce blood changes.

The principal and most serious toxic reaction of the sulfonamides seems to be the development of anemia, and there are questions related to this reaction that also need to be studied and answered. For instance, the type of drug used is definitely related to the anemic reaction; the number of types used in combination; the age of the patient; race, etc.

The impression was at one time prevalent that there need be no fear of toxic effects after discontinuance of the drug, but it seems that this impression no longer prevails. It has been shown that hemolytic anemia or rapid diminution of the white cell count may occur after the drug is discontinued.

Severe anemia and leukopenia may occur at any time during sulfonamide therapy, and blood counts should be made every two or three days during the course of treatment; and even after discontinuance of the drug, patients should be kept under surveillance for ten days.

The use of these drugs, like all new methods and drugs in medicine, has been pursued to the extent of faddism. With the remarkable, not to say miraculous, results that have followed the use of these compounds, it is inevitable that they should be tried in virtually all types of infection, in many of which they would not be specific, but would elicit toxic reactions. Such enthusiastic use, however, is understandable because of the miracles that chemotherapy has already brought to medicine. In some instances, however, it has encouraged surgical practices which seem to discard sound surgical judgment for the attractive mysticism of a newly found procedure or drug therapy.

From the dental standpoint, it is well worthy of note and heed that sulfanilamide is most effective in open traumatic wounds and that it is in some forms quite irritating to the tissues—in some instances, to the

point of being caustic, and causing death of the tissue cells and even abscess.

The present state of knowledge of the use of sulfonamides would seem to warrant the dental use of these compounds in fresh open extraction wounds and traumatic wounds of the mouth tissues and, under supervision of the physician, in cases of valvular cardiac conditions in which tooth extraction is necessary.

Because of the already proved value of sulfanilamide and sulfathiazole in open operative wounds, their use will find a broad field of application in the surgical procedures attendant upon war injuries, and it is in this field that dentistry and medicine both will find and develop many uses that would be slow in developing under peace-time conditions.

We are reaching out into broader fields of usefulness in health service and in the application and adoption of the newer methods, procedures and drugs, and we should keep constantly in mind the axiomatic injunction of Osler to first be certain that what we do and what drug we administer will do the patient no harm.

DEATH OF DR. JOHN P. BUCKLEY

IT is with much sadness that we announce the sudden death of Dr. John P. Buckley, of Los Angeles, Calif.

An obituary notice of Dr. Buckley will be published in an early issue of THE JOURNAL.

DEATH OF DR. W. E. CUMMER

We regret to announce the sudden death of Dr. William Ernest Cummer, of Toronto, Canada.

An obituary notice of Dr. Cummer will be published in a future issue of THE JOURNAL.

BIBLIOGRAPHICAL

Practical Anesthesia for Dental and Oral Surgery, Local and General

By HARRY M. SELDIN, D.D.S., F.I.C.D., F.I.C.A. Consulting Oral Surgeon, Harlem Hospital; Formerly Director of the Division of Dentistry, Department of Hospitals, City of New York; etc., Edition 2. Cloth. 541 pages with 217 illustrations. Philadelphia: Lea and Febiger; 1942.

THIS book can be divided into two parts for discussion. The first part, consisting of 272 pages, deals with the technic of local anesthesia; the second part, of 268 pages, discusses general anesthesia. The volume as a whole presents a complete account of the procedures involved in the anesthesia of the dental structures. The first section opens with a short but complete description of the regional anatomy involved, a topic of obvious importance for successful local anesthesia. The composition and compounding of anesthetic solutions are next described, and various suitable alternatives to freshly prepared solutions are discussed. The remainder of the necessary armamentarium is presented, followed by the description and illustration of the various types of block and infiltration anesthesia satisfactory for use in oral surgical procedures. The second part of the book presents, first, the physiologic basis for general anesthesia, followed by a discussion of the use of nitrous-oxide oxygen and, more briefly, other anesthetic agents. The newer agents, such a divinyl ether and pentothal sodium, are briefly considered and their place in dentistry is discussed. In general, the book is carefully written and presents a complete account of the use of anesthetic agents in the oral field. A few errors were noted. On page 520, the author recommends premedication of the patient with one one-fiftieth *gram* of atropine. The book, however, can be recommended for use as a suitable text and reference work in this field.

F. F. K.

Modern Methods of Tooth Replacement

By JACOB R. SCHWARTZ, D.D.S. Member Advisory Board on Vocational Education, Board of Education, City of New York. Cloth. 748 pages; 1,011 illustrations. Brooklyn: Dental Items of Interest Publishing Co., 1942.

THIS volume is the collected papers of a series of articles by Dr. Schwartz which were recently published in *Dental Items of Interest* on the general subject of bridge and partial denture construction. The author is well known for his previous books, and this volume maintains the high plane which he has attained in his writings. Several criticisms may be directed toward this work, however. The book contains too many direct quotations from current authors on various subjects, and this method of writing does not lend itself to a smooth, integrated discussion of the material at hand. When Dr. Schwartz describes procedures in his own words, the text is good. Precision appliances are well described and illustrated, and it should be mentioned here that the illustrations with the exception of certain x-ray pictures are very well done. Little concern has been given in the book to the important biologic factors in all successful tooth replacement and this definitely detracts from the value of the book. The volume is somewhat disorganized in that procedures are not described in order. For example, Chapter 11 is devoted to model duplication, whereas impression technic is discussed three chapters later, in Chapter 14. The volume closes with an adequate index and a pertinent bibliography. This book will appeal mainly to the practicing dentist, and can be recommended as an authoritative text on the construction of bridge and partial denture elements to those interested in this field.

F. F. K.

ASSOCIATION ACTIVITIES

Contents

PRESIDENT'S MESSAGE
Membership 1037
COMMITTEE ON DENTAL PREPAREDNESS
Tire Rationing 1038
Procurement and Assignment Service: War Manpower Commission 1040
Procurement and Assignment Service Agreement Between the Federal Security Agency and the Office of Civilian Defense 1042
Occupational Deferments of Doctors, Dentists and Veterinarians 1043
BUREAU OF PUBLIC RELATIONS
Sponsorship of Newspaper Dental Educational Articles 1044
Block or Institutional Advertising 1044
Carleton College Dental Health Service, 1940-1941.
William A. Grey, D.D.S. 1045
COUNCIL ON DENTAL THERAPEUTICS
Local Use of Sulfonamides.
F. D. Ostrander, D.D.S., M.S., and F. W. Hartmann, M.S. 1051
Accepted Dental Remedies 1064
COUNCIL ON DENTAL EDUCATION
The Place of Medical Sciences in Dental Education.
Samuel P. Capen 1065
COMMITTEE ON LEGISLATION
Dental Jurisprudence—Avoidance of Unnecessary Malpractice Actions by the Oral Surgeon.
Dudley C. Hughes, D.D.S. 1071
Recent Court Decision. Malpractice: Skill, Care and Judgment in Extraction 1081
COMMITTEE ON ECONOMICS
A Dental Program for Industry.
R. M. Walls, D.D.S. 1083
NEWS ITEMS
A Dental Unit for the Anzacs 1088
M. Don Clawson to Be Director of the School of Dentistry of Meharry Medical College 1088
Thomas B. Hartzell to Be Honored 1089
AMERICAN DENTAL ASSOCIATION
Map of City of Boston 1090
84th Annual Meeting 1091
Hotel Accommodations 1092
Membership Page 1094
OBITUARIES
Samuel C. G. Watkins 1095
Charles Bunting Colson 1096
Leonard F. Pogue 1097
George Evans 1097
Deaths 1098

President's Message

MEMBERSHIP

On another page of this issue of THE JOURNAL will be found the usual monthly chart showing the membership standing of the several constituent societies as of April 30, 1942. It is interesting, in examining this chart, to note that on the foregoing date, there were six societies which have equaled or surpassed their 1941 record: Southern California, Georgia, Mississippi, Puerto Rico, Tennessee and Texas.

Membership figures for April 30, 1942 as compared with those for April 30, 1941 are interesting. April 30, 1941, there were 41,061 regular members; April 30, 1942, there were 43,947 regular members; an increase of 2,886. April 30, 1941, there were 1,980 junior members; April 30, 1942, there were 2,992 junior members; an increase of 1,012. April 30, 1941, there were 148 affiliate members; April 30, 1942, there were 220 affiliate members; an increase of 72. April 30, 1941, the total membership was 43,189; April 30, 1942, the total membership was 47,159; an increase of 3,970.

During my travels to the various state society meetings, an increased interest has been evident in increased membership and attendance. This, very probably, is due to the part dentistry is taking in the total war effort, but it also presents an opportunity for organized dentistry to serve the greater membership in such a fashion as to demonstrate the value of membership.

There is one constituent society record worthy of special comment. No one can forget Pearl Harbor. No one can imagine the thoughts of the dentists practicing in Hawaii. In Hawaii, there are 221 dentists, yet, in spite of the anxiety and turmoil, 182 of the 221 have seen fit to pay their dues for 1942 and thus carry on with the profession. What they have done, the other societies can do. The slogan for the American Dental Association could well be "Remember Hawaii."

Orren a. Oliver

COMMITTEE ON DENTAL PREPAREDNESS

TIRE RATIONING

THE Committee on Dental Preparedness has watched the rubber situation closely and, in consideration of war needs, has approached the Government in an effort to secure tires and tubes for at least certain members of the profession. Previous correspondence was carried in the February issue of THE JOURNAL, page 289. Recent correspondence is as follows:

OFFICE OF PRICE ADMINISTRATION
Washington, D. C.
Temporary Building D

April 7, 1942

Dr. C. Willard Camalier
1726 Eye Street, N. W.
Washington, D. C.
Dear Dr. Camalier:

Your letter of recent date is greatly appreciated.

We fully realize the value of your specialized services to the medical profession. It was our desire to include in the eligibility list the dentists, as well as the hospital and laboratory technicians, all classes of nurses, pharmaceutical experts and many others whose contribution to the medical profession is very important. The number of automobiles involved, however, represents a tire usage far beyond our ability to supply in face of the current rubber shortage.

In a large program such as this, we think you will agree that exceptions just cannot be allowed and we only hope that unusual situations can be overcome with the aid of the public transportation system.

We allow the Local Rationing Board to interpret the Tire Rationing Regulations to the best of their ability and if the few dentists you mention are licensed by their state to either administer drugs or perform surgical operations, we believe such a person could be considered eligible for tires.

Very truly yours,
GRENVILLE R. HOLDEN, *Chief*
Tire Rationing Division

April 14, 1942

Mr. Grenville R. Holden, Chief
Tire Rationing Division
Office of Price Administration
Temporary Building D
Washington, D. C.
Dear Mr. Holden:

In response to your communication of April 7, the dental profession appreciates very much your kind consideration of its problems and feels that you realize the health hazard to patients involved in the lack of automobile transportation for certain dentists who perform surgical operations and administer drugs. While the last paragraph of your letter indicates that tire rationing boards would be liberal in their interpretation regarding dentists of this type, I am afraid that unless word is received from National Headquarters, it will be difficult to accomplish these results. As a matter of fact, tire rationing boards apparently will not include members of the dental profession because they were not named in the original order with physicians, nurses and veterinarians.

May I request, therefore, that a special communication be issued from headquarters which could be used by eligible members of our profession in line with the suggestion in the last paragraph of your letter.

With kindest regards, I remain,

Very sincerely yours,
C. WILLARD CAMALIER, *Chairman*
Dental Preparedness Committee

OFFICE OF PRICE ADMINISTRATION
Washington, D. C.

April 30, 1942

Dr. C. Willard Camalier
1726 Eye Street, N. W.
Washington, D. C.
Dear Dr. Camalier:

Thank you very much for your letter of April 15, with further reference to the eligi-

bility of status of dentists under the Tire Rationing Regulations.

We had hoped that the rubber situation might improve in order that we might extend eligibility for new or recapped or retreaded tires to others, such as dentists, who are engaged in essential work. However, the fact of the matter is that instead of improving, the rubber situation has grown increasingly acute and at the present time it is simply impossible to provide any further extension of eligibility classifications. As a matter of fact, it may well become necessary to place further restrictions on the use of tires.

Mr. Parker has called to our attention your thoughtful suggestion designed to minimize the additional work which would fall upon local boards if we were to include dentists among those eligible for tires. We have referred the suggestion that the State Military Affairs Boards of the American Dental Association pass upon the need of each dentist before he makes application to his local board to our Planning and Research Branch for consideration should it be found possible in the future to include dentists among those eligible for tires.

It is a matter of sincere regret that the facts simply preclude a more favorable response at this time. However, I am sure that you will understand our situation.

Very truly yours,
CHARLES F. PHILLIPS, *Acting Chief*
Tire Rationing Division

Apparently, the rubber shortage has become more acute, the Committee on Dental Preparedness on May 6 being informed by Mr. Schwab of the Federal Tire Rationing Board that further restrictions would have to be placed on persons having preferred rating for tires. Further liberalization of the regulations at this time, according to Mr. Schwab, is out of the question, but from the last letter received from Mr. Charles F. Phillips, under date of April 30, 1942, the door is not entirely closed. The following news item carried in the *Washington Times-Herald,* dated May 7, seems to cover the Government's present attitude on the tire situation.

The Government yesterday moved one step closer to taking over your automobile and your tires. Approval of seven top officials to a requisitioning measure was disclosed yesterday afternoon by Chairman Robert R. Reynolds (D), of North Carolina, of the Senate Military Affairs Committee.

Before closed sessions of the committee the officials told the Senators that the rubber shortage is "more serious than has ever been expressed to the people of this country," Reynolds said to reporters.

NO HOPE IN SYNTHETICS

"Actually," he emphasized, "the situation is perilous from a military standpoint. In order to provide our Army with rubber we are going to have to get not every pound of rubber but every ounce of rubber that is available."

No relief for civilians will come from synthetic rubber plants, Reynolds predicted. All synthetic rubber will go entirely to the nation's military forces, he declared.

(Government seizure of private automobiles was forecast last Sunday in the *Times-Herald* in George Riley's U. S. and Us column.)

SEIZURE BILL'S PROVISIONS

Another committee member after listening to the testimony said he could see no possibility of any rubber available for civilian use one year from today. Even the so-called "essential" civilian users will have to get along on whatever stocks they have, he believed.

The requisitioning bill under consideration was sponsored by Senator Sheridan Downey (D), of California. It provides for spending up to $5,000,000,000 to provide a stockpile of cars, accessories and tires for Government purposes and for use in transporting war workers.

The measure was approved as an aid to the mobilization of transportation facilities, as well as for the conservation of both rubber and automobiles.

APPROVED BY EASTMAN

One of the officials giving it the nod was Defense Transportation Director Joseph B. Eastman, who was empowered Monday by the President to limit the use of rubber-borne transportation facilities, and regulate its distribution.

Price Administrator Leon Henderson was another to approve of the idea. Henderson has contended that he already had the power to take over automobiles, but preferred to wait until a specific bill was passed.

He is reported to have told the committee that the Government may have to start requisitioning cars in the near future. But members did not believe that drastic steps would be taken immediately.

SPEED CURB BILL

Other officials who appeared before the committee included Undersecretary of War Robert P. Patterson, Deputy Petroleum Coordinator Ralph K. Davies, Budget Director Harold Smith, Arthur B. Newhall, WPB rubber branch director, and F. Eberstadt, chairman of the Army and Navy Munitions Board.

A companion bill, introduced by Senator Reynolds, to set a nation-wide speed limit of 40 miles an hour was also said to have been approved by the group.

After listening to the testimony committee members suggested that President Roosevelt give the nation a picture of the seriousness of the rubber situation in a broadcast to the nation.

Senator R. R. Reynolds, chairman of the Senate Military Affairs Committee, was quoted on the same day as follows:

The rubber situation is more serious than has ever been expressed to the people of this country . . . motorists who think synthetic rubber production will relieve their tire troubles sooner or later are "indulging in wishful thinking."

PROCUREMENT AND ASSIGNMENT SERVICE

WAR MANPOWER COMMISSION

PAUL V. MCNUTT, chairman of the War Manpower Commission, announces that the Procurement and Assignment Service for Physicians, Dentists and Veterinarians has started its machinery to secure 16,000 physicians and 3,000 dentists for the armed forces before the end of 1942 without weakening the medical service of civil and industrial populations.

An official enrollment form and a new questionnaire are now being mailed to every man licensed in the three professions. There are 186,000 licensed physicians, 71,000 dentists and 12,000 veterinarians.

The new questionnaires supplement those circulated as early as 1940 by the professions in order to make inventory of those available for military service. They also will supplement information previously requested, seeking information as to experiences in foreign countries; any ability to speak and understand foreign languages, and hobbies that may have value, such as special knowledge of photography and cryptanalysis.

As part of the manpower program, it is essential that every physician, dentist and veterinarian return the enrollment form at once.

Any physician or dentist who does not receive an enrollment form by May 10 will know that his name is not on record, and should write for the form to the National Roster of Scientific and Specialized Personnel, Washington, D. C.

Every physician will also have the opportunity to indicate his preference, in order, as regards service; that is, whether he would prefer service with the Army or Navy, in the field of public health, in industry or in the care of veterans, essential research, teaching or private practice.

Dentists and veterinarians will also have the opportunity to indicate order of preference, and due regard will be given such preference as far as is consistent with the needs of military service.

As regards the needs of the civilian and industrial population, and in view of the depletion of available physicians in certain communities, the President has charged us with maintaining due regard for the needs of the public.

The first step in this direction is the continuation of medical education.

The Secretary of the Navy recently approved a change in Navy regulations whereby it is now possible for persons who have been accepted for entrance in the next entering class, all medical students in Class 3 medical colleges and all dental students in approved dental colleges to be appointed in the United States Naval Reserve with the commission of ensign H-V (P) provided they meet the physical and other requirements for such appointment.

The Secretary of War has authorized the commission as second lieutenant, Medical Administrative Corps, U. S. Army, of young men of similar status. These men are not subject to induction under the Selective Service Act. The Army and Navy authorities will defer calling these officers to active duty until they have completed their medical education and one year's internship.

All interns should apply for commissions as first lieutenant, Medical or Dental Corps, U. S. Army, or as lieutenant (j.g.), U. S. Navy or Naval Reserve.

After completion of twelve months internship, except in those instances in which the necessity of continuation as a member of the staff or as a resident can be defended by the institution, all who are physically fit may be required to enter military service.

Regarding medical care of the civilian and industrial population at home, Mr. McNutt emphasizes that every precaution is being taken to see that the medical and dental structure shall be weakened as little as possible by the call of physicians and dentists into the armed forces.

For the first call of physicians, it should be possible to secure a suitable number to meet the demands of the armed forces without too great dislocation of civilian needs. This is being accomplished by the evaluation of the various community needs by state and county chairmen. In the meantime, more precise standards and criteria for civilian needs are being developed and, it is hoped, will be announced shortly.

The Procurement and Assignment Service was authorized by the President October 30, 1941, and was set up in the Office of Defense Health and Welfare Services. When the War Manpower Commission was established, April 18, 1942, the Procurement and Assignment Service was transferred to the commission.

The functions of the service are (1) to receive from various governmental and other agencies requests for medical, dental and veterinary personnel; (2) to secure and maintain lists of professional personnel available, showing detailed qualifications of such personnel, and (3) to utilize all suitable means to promote voluntary enrollment, with due regard for the over-all public health needs of the nation, including those of governmental agencies and civilian institutions.

Frank H. Lahey, president of the American Medical Association, Boston, is chairman of the directing board of the Procurement and Assignment Service. Harvey B. Stone, associate professor of surgery, Johns Hopkins University School of Medicine, Baltimore, is vice chairman, C. Willard Camalier, Washington, D. C.; Harold S. Diehl, dean of medical sciences, University of Minnesota, and James E. Paulliin, Atlanta, are the three remaining members. Lieut.-Col. Sam F. Seeley is executive officer.

PROCUREMENT AND ASSIGNMENT SERVICE AGREEMENT BETWEEN THE FEDERAL SECURITY AGENCY AND THE OFFICE OF CIVILIAN DEFENSE

SUBJECT: Temporary Hospitalization and Medical Care Necessitated by Enemy Action to Civilians.

In an order dated February 6, 1942, the President of the United States allocated funds to the Federal Security Administrator for the following stated purposes:

. . . to be expended by the Administrator of the Federal Security Agency, or through such Federal or other agencies as he may designate, for providing temporary aid necessitated by enemy action to civilians, other than enemy aliens, residing in the United States: (1) who are disabled; or (2) who are dependents of civilians who are killed, disabled, interned, or reported as missing, or (3) who are otherwise in need of assistance or services. This allocation is not intended to cover civil or other personnel of the Federal Government for whom other provisions are contemplated.

In order to carry out that part of the foregoing order which relates to medical and hospital care, Paul V. McNutt, Federal Security Administrator, and James M. Landis, Director, Office of Civilian Defense, have agreed that the Federal Security Agency, through the United States Public Health Service, will carry out the following program.

CASUALTY HOSPITALS

All the hospitals in the nation, voluntary and governmental, may serve as casualty hospitals of the Emergency Medical Services established by the Office of Civilian Defense for the care of civilian casualties caused by enemy action.

MEDICAL PERSONNEL

Emergency base hospitals for the care of evacuated injured persons conceivably may require a large staff of physicians, surgeons and other specialists, including dentists, some of whom must be of high professional caliber. Since such a balanced technical staff cannot be assembled hurriedly in time of need and must be enrolled for future service, as are the Affiliated General Hospital Units of the Army, it is proposed to expand the commissioned reserve of the United States Public Health Service for this purpose.

Recruiting will be carried on in collaboration with the Procurement and Assignment Service in accordance with existing agreements. In order not to interfere with the supply of physicians for the Army and the Navy, recruitment will be largely from the older age groups, from physicians with minor physical disabilities which make them ineligible for military service and from woman physicians. Some specialists may be given a consultant status, so as to be available for part-time duty.

Other members of the reserve, especially obstetricians, pediatricians, dentists and woman physicians, will also be appointed for service in reception areas to which women and children are evacuated.

OCCUPATIONAL DEFERMENTS OF DOCTORS, DENTISTS AND VETERINARIANS

THE following memorandum (I-420) was sent to all state directors by Lewis B. Hershey, director of the Selective Service System, Washington, D. C. The amendment involves a change from the Corps Area Committee of Procurement and Assignment Service to separate state chairmen for medical doctors, dentists, and doctors of veterinary medicine, and also a change with respect to the consideration of dependency in classifying such registrants.

National Headquarters
SELECTIVE SERVICE SYSTEM
21st Street and C Street N. W.
Washington, D. C.

January 28, 1942
Amended 4/28/42

MEMORANDUM TO ALL STATE DIRECTORS (I-363)
LOCAL BOARD RELEASE (89)

SUBJECT: Occupational Deferments of Medical Doctors, Dentists and Doctors of Veterinary Medicine (III).

1. Information previously distributed by this headquarters clearly indicates an over all shortage of medical doctors, dentists and doctors of veterinary medicine in the nation. Since war was declared, the shortage of these professional men has become acute. It is now manifest that every qualified doctor, dentist and veterinarian must serve where he can render the greatest professional service to the nation.

2. In order to accomplish this purpose, the President, by executive order, has formed the Procurement and Assignment Service. This service was formed primarily for the purpose of gathering and making available information with respect to the supply of qualified practitioners in the fields of medicine, dentistry and veterinary medicine, with a view to securing the most effective allocation of medical manpower as indicated by the requirements of the armed forces, civilian needs and industrial medicine.

3. To work with the headquarters of the Procurement and Assignment Service, there has been appointed for each state and the District of Columbia a state chairman for medical doctors, a state chairman for dentists and a state chairman for doctors of veterinary medicine. These state chairmen will secure information concerning their respective professions and will give advice regarding the allocation of medical manpower.

4. In considering the classification of any registrant who is a qualified medical doctor, dentist or doctor of veterinary medicine, the director of Selective Service desires that local boards, through the state director, shall consult with the respective state chairman of the Procurement and Assignment Service.

5. In considering the classification of a registrant who is a qualified medical doctor, dentist or doctor of veterinary medicine, the local board may, if it finds such registrant should not be given deferment for reasons other than dependency, take into consideration the pay and allowances which such registrant will receive in the event he is commissioned in the armed forces. In practically all instances, the pay and allowances of such registrant, if he was commissioned as an officer, would be sufficient to eliminate the question of dependency.

6. For the convenience of the state director and the local boards, the names and addresses of the respective state chairmen of the Procurement and Assignment Service were published in the March 1942 issue of THE JOURNAL.

BUREAU OF PUBLIC RELATIONS

SPONSORSHIP OF NEWSPAPER DENTAL EDUCATIONAL ARTICLES

CRITICISM is occasionally directed at dentistry, dental societies and dentists because they sponsor or byline dental educational articles appearing in the daily or weekly press.

In an effort to partially overcome this criticism, unjustifiable as it is, the Committee on Public Health and Education, at the Houston Meeting, 1941, passed the following recommendation: "From a public relations standpoint, it is advisable, wherever possible, for news stories emanating from the American Dental Association to carry the byline of the local or state health department rather than that of the local dental society. Such articles should also carry, as they have in the past, the statement 'furnished by the American Dental Association.'" This recommendation was approved by the Board of Trustees at the February 1942 meeting.

The Board of Trustees reasoned in passing this recommendation that even though the news articles are issued by the A.D.A., their release or use by state or local health departments will automatically give them the approval of those health bodies.

This should, of course, give added weight to the importance of the health message.

BLOCK OR INSTITUTIONAL DENTAL ADVERTISING

BECAUSE of the differences of opinion among dentists and dental societies regarding the use of so-called "block" or "institutional" advertising and because of the number of requests for a ruling pertaining to its use, the Committee on Public Health and Education, after due deliberation, passed the following recommendation at the Houston Meeting, October 1941: "This committee feels that paid newspaper block advertising sponsored by the American Dental Association or any of its components is an ineffectual type of educational material and that it does not meet the approval of the committee as such."

In concurring with the Committee on Public Health and Education and in adopting this recommendation, the Board of Trustees stated that it did not disapprove of the use of "block or institutional" advertising by state or local dental societies, it simply did not approve of it in the light of present information on the subject.

This opinion passed by the Board of Trustees at the February 1942 meeting confirms that of the Committee on Public Health and Education. Both the Committee on Public Health and Education and the Board of Trustees are desirous that this recommendation be brought to the attention of all members for the guidance of dental societies and dentists who are interested in the use of this type of educational material.

CARLETON COLLEGE DENTAL HEALTH SERVICE, 1940-1941

By WILLIAM A. GREY, D.D.S., Northfield, Minn.

THE Carleton College Dental Health Service has been functioning since January 1931. Therefore, an excellent opportunity has been afforded to estimate its value to the student.

The primary function of the dental service is to educate students to an appreciation of the value of mouth hygiene and its relation to general health. Existing defects are brought to the students' attention, and the importance of having them corrected is emphasized.

The office space includes a small reception room, an x-ray room with lead walls, a room for examinations, an adequate developing room, a room equipped for mounting, reading and filing and an office.

Wherever this service is installed, it should be in the hands of a full-time man, who should not be permitted to render restorative dental work of any kind to the people included in this service. He should sign an agreement to the effect that if at any time he wishes to enter private practice, he will establish his office at least 50 miles from the place where this work is carried on.

At the beginning of each college year, a short talk is given to the freshman class concerning the characteristics and value of oral health as contrasted with the disease conditions so often found; with special emphasis on preventive rather than curative measures.

The work of the dental service, which is entirely diagnostic and advisory, is carried out in the following manner:

Students each year have two appointments. At the first appointment, a fourteen-film set of roentgenograms is taken and, at the second appointment, a thorough clinical and roentgenographic examination is made. All cavities and conditions visible clinically are checked and recorded and the defects shown by the roentgenograms noted. There is also a thorough check of all restorative work previously done. The educational value of the work is always foremost.

Time is given during the examination to explain to the individual student the import of defects and any other existing conditions, not only from the standpoint of a healthy mouth, but also from the standpoint of general health, and to answer any questions that the student may wish to ask. A complete record of the tentative diagnosis is then attached to the roentgenograms. (See Chart page 1048.)

Before vacation periods, students are requested to call for their roentgenograms and take them to their dentists. They are asked to return the films to the dental service after vacation. Upon graduation, students are entitled to the four sets of roentgenograms taken during their school course. The duplicates remain at the college as a permanent record.

In comparing the years 1934-1935 and 1940-1941, the drop in number of cavities and the increase in number of fillings is remarkable. The number of devitalized teeth has increased, and this, it is believed, has resulted when pulps have been exposed or almost exposed, and treatment has been recommended instead of extraction. In the accompanying table, comparison is made between the two years' work.

COMPARISON OF RECORDS

	1934-1935	1940-1941
Students examined	682	816
Cavities found clinically...	1,863	932
Additional cavities found roentgenographically	1,033	1,203

Average number of cavities per student	4.2	2.6
Abscessed teeth	33	35
Pulpless teeth	97	114

In the examinations of the last few years, we have not examined the interproximal surfaces so thoroughly as we could have done before looking at the x-ray films, and consequently, as will be seen, more cavities were found roentgenographically this year.

A pulpless tooth, according to our interpretation, is one the pulp of which has been removed and the root canal partially or entirely filled. Abscessed and pulpless teeth are considered potential foci of infection. Removal of definitely abscessed teeth is advised unless there is a possibility of restoring them to a healthy condition. Medical and dental service records are compared, and, from the two, a final diagnosis is formulated as it relates to the general health of the student. Before extraction of teeth is advised, careful consideration is given to the student's general health and also to the preservation of the dental arch from the standpoint of function and esthetics. We realize that if the importance of the preservation of teeth and the maintenance of a healthy mouth had been emphasized earlier in life, and the mouth checked periodically, a large percentage of missing teeth might have been saved. This, we believe, is plainly shown by the accompanying table. Our students come from a large area, being scattered throughout the United States, but, year after year, they come from much the same localities. Consequently, the dentists in these areas, knowing that the mouths are to be carefully checked at Carleton College each year, take more pride in the mouths of these students. The students also are taking better care of their mouths. Therefore, as they return to us, we are finding fewer and fewer cavities and much more efficient work in clinical and x-ray examination.

By impacted teeth, we mean those with no chance of eruption. In our judgment, these teeth, owing to their malposition, can never assume their proper functional relationship with the other teeth in the arch, and their presence is likely to cause neuralgia, inflammatory conditions of the surrounding tissues extending back into the throat region, injuries to the adjacent teeth, etc. We have advised the removal of almost all impacted teeth, since it is believed that many of these conditions can be avoided by early removal of impacted teeth. During the first few years of the work, an effort was made to save a number of the partially impacted lower third molars to see what might happen to these teeth during the four years that the student was in college. After a thorough trial, we realized that we were making a mistake, as only a small percentage of the teeth changed position at all and a large number gave trouble. Therefore, we are now advising the removal of all of the definitely impacted and most of the partially impacted third molars during the student's four years at Carleton. We also know that the younger the student when these teeth are removed, the simpler the operation. Some teeth we have called impacted probably should have been called unerupted; but this number is very small. We mean the cuspids and bicuspids, which should, in the majority of cases, be brought into normal position in the arch by orthodontic measures. Many of these conditions are being corrected now as a result of our educational work.

Since the inception of our dental work at Carleton College, we have been very much interested in the students' mouths from the standpoint of orthodontia, and have gone so far as to write to parents in some cases. Many extreme conditions have been found in our institution, not only malocclusion and poor appearance, but also interference with breathing and speech. These conditions, we know, are a handicap to health and career throughout life. After they have been called to

the attention of students, parents and dentists, many of these irregularities have been corrected while these students are at Carleton. Since the opening of the second semester, we have examined 493 students, and 127 of these have had orthodontic work done some time during the time at Carleton or before they came. Most of these cases have proved satisfactory, a great improvement having been made in the mouths of the students. One of the discouraging factors, however, in some of these cases, is the extreme resorption of the roots of the anterior teeth. Once in awhile, we find cases in which resorption is present throughout the entire mouth. We have been led to believe, after ten years of experience at Carleton College, that resorption is brought about by the movement of the teeth.

It has been brought to our attention many times that resorption of roots is found in a number of cases in which no orthodontic work has been done, and also that resorption has been brought about in other cases by the general physical condition. Therefore, we have gone into these two phases of our work very carefully in examining approximately 800 students each year. Just one case has been found in which there was slight resorption of roots of healthy teeth and no orthodontic work had been done, but this was slight and hardly worth mentioning. This year, 816 students have gone through our department. Of these 816, forty-three had extreme resorption of roots of healthy teeth, and in every case orthodontic work had been done.

We have at Carleton College an excellent medical health service, and every one of the forty-three students, along with the other students, has had a thorough physical examination. Of these forty-three students, thirty-seven have an A rating, five have a B rating and one has a C rating as to general physical condition. Charles E. Lyght, director of the health service, informs us that the physical condition of none of these students would have anything to do with the resorption of roots.

Our service has gone into this field thoroughly from a research angle, and we have come to the conclusion that, in all cases when there has been a noticeable amount of resorption of roots of healthy teeth, orthodontic work had been done. The age during which the work was done, we found, had little effect on the amount of resorption. In our judgment, in all orthodontic cases, frequent x-ray examination should be made while the work is in progress, and if at any time absorption of roots is noted, the cause should be sought before the work proceeds.

The main concern throughout our work is to gain the interest and cooperation of the student. We believe that today we have the complete cooperation and appreciation of the student body. These conclusions are drawn from the amount of recommended work done for the students between yearly examinations.

The cost of x-ray and other examinations for students is included in the tuition. The faculty members have been made a special price which covers our overhead, and which was voted on by the dentists in the community. Fully half of the faculty have taken advantage of the service. One of the most gratifying things in the ten years of work is the increased interest and appreciation shown by the faculty.

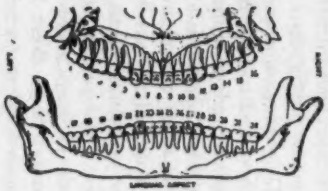
The dining room and kitchen employes are required to have their mouths radiographed and examined each year and kept clean. As this is a requirement, they are charged the minimum fee and then are required to have the necessary work done to insure clean, healthy mouths. These employes are told that if lack of funds prevents them from having the necessary work done, arrangements will be made for dental service. When we have cases of this kind, we ask the patients

Name..... Age.....

Address.....

Date..... Year..... No.....

CARLETON COLLEGE HEALTH SERVICE



We reserve the right to Xray the mouth at any time during College Course.

Student last saw his dentist April..... ORAL DIAGNOSIS By F

Gum Condition Good Home Care Good Prophylaxis Needed

		UPPER LEFT								UPPER RIGHT								LOWER LEFT								LOWER RIGHT							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
CLINICAL	Missing Teeth	✓															✓	✓															✓
	Cavities																																
	Type of Restoration	O A G	O A G	O O A	O A	O G	D S	O S		D S	D S	O A	O O A	O G	O G	O A		O O A	O O A	O A	O A	D S	D S	M O S		M O S	M O A S	M O A G	O O A	O O A	O O A		
	Defective Contacts																																
	Vitality																																
RADIOGRAPHIC	Cavities						M	D		D										D									M				
	Pulpless Teeth																																
	Apical Areas																																
	Unerupted Teeth																																
	Impactions																																
	Questionable Teeth																																
	Questionable Restorations																																
	Roots																																
	Extractions Recommended																																
	Alveolar Process																																

NOTICE - Full mouth X-Rays are required of every student each year as part of physical examination. We suggest that the dentist in charge re-check this mouth and use his discretion concerning the above diagnosis.

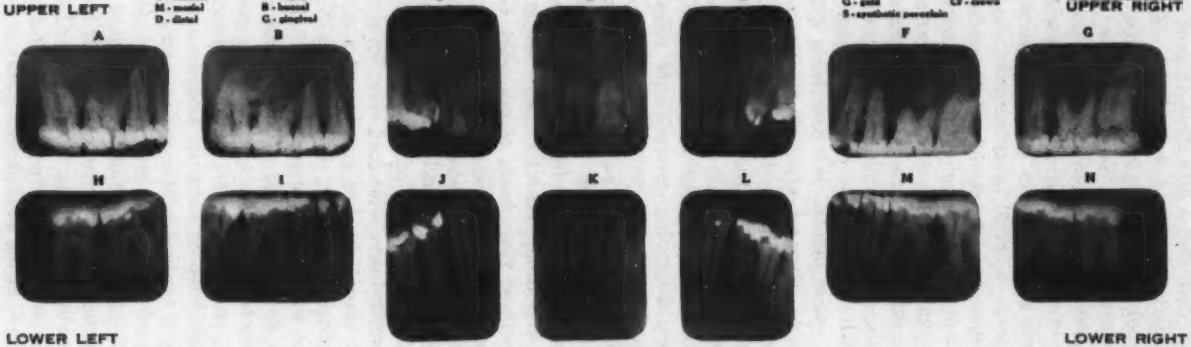
KEY TO LOCATION OF CAVITIES
O - occlusal L - lingual
M - mesial B - buccal
D - distal G - gingival

TYPE OF RESTORATION
A - amalgam C - cement
G - gold Cr - crown
S - synthetic porcelain

oo - 2 surface filling (as M O D)
o - 1 surface filling (as D O)

UPPER LEFT

UPPER RIGHT



LOWER LEFT

LOWER RIGHT

DENTAL X-RAY MOUNT CO., 2548 NIC. AVE., MINNEAPOLIS, MINN.

"There is not one single thing in preventive medicine that equals mouth hygiene and the preservation of the teeth." Dr. Wm. Osler.

AS DENTISTS - LET'S DO OUR PART

whether they are willing to have us call or write to their dentists. If they have been honest with their dentist in the past, he is more than willing to make it possible to have the required work done without any great inconvenience. All of the employes have had their work taken care of, and the majority have had their mouths placed in good condition throughout. No one has asked to have work done free of charge, all being willing to pay a reasonable fee. Therefore, we draw the conclusion that it is not lack of money alone, but also of education and interest that prevents many from having work done.

All students are informed that lack of money will not stand in the way of necessary dental service; but, up to this time, not a student has been unwilling to pay for his work as soon as he is able. If a student is unable to pay for his work, we ask his permission to call or write to his dentist. In writing to his dentist, we ask whether he would be willing to do the student's work and take his note, without interest, to be paid as soon as the student is financially able. We have had few cases of this kind, and all such patients that we have had to date have paid their bills in full.

During the years that this work has been carried on, lantern slides have been made of cases that are outstanding from a dental educational angle. A number of these have been used in the freshman lectures and lectures at other colleges, and to present the Carleton College Dental Service at dental society meetings. The work was shown under the head of a health exhibit at the Annual Session of the American Dental Association, St. Paul, Minn., August 1934, and at all Minnesota state meetings since that time except for the last two years. The service was demonstrated at the Chicago Dental Society meeting several years ago, and again in 1940. It was also shown at the American Dental Association Meeting in Cleveland in 1940.

After ten years of work, we believe, as we did five years ago, that the educational work has been far more beneficial to the student body than if we had also attempted to carry out restorative work. It is still our belief that if restorative work is done in an institution, individual educational work will be neglected. We are sure that this work has stimulated to greater efficiency and a higher standard of dental service those dentists who have come in contact with the students' reports or have become informed concerning our work.

Always uppermost in our minds are the benefits to be derived by the students from the service from the educational work, and from having brought to their attention the work which should be done. In our judgment, the dentist and the student derive equal benefit, the former through the stimulus that he receives to greater efficiency in his own office.

We are hoping that, in the year to come, we shall have the opportunity of giving regular periods of instruction in the care of the mouth to all freshman students and others whom it would benefit. During the past year, we have seen a number of cases of gingivitis. The patients were all given individual demonstrations in the everyday home care of the mouth by our dental hygientist, Miss Winifred Haglund. Nearly all of these cases cleared up after two or three weeks of home care. This is gratifying not only to us, but to the students as well, who are always proud of what they have accomplished. We also found mouths showing a lack of thorough everyday home care. In these cases, the students had not entirely neglected their mouths, but had never been taught effective home care. All of these students, as far as possible, were given instruction by Miss Haglund.

After roentgenographing and examining mouths of about 9,000 students, we have data which we believe establishes the value of the x-rays in examining the mouths of young persons of college age.

After the examination of these students, each operator carrying out the work as thoroughly as possible from the standpoint of clinical diagnosis followed by the x-ray diagnosis, the records show that about 40 per cent more cavities were found with the assistance of the x-rays. Since cavities, periodontal conditions, devitalized, abscessed and impacted teeth and defective fillings are found which would otherwise probably have been missed, we cannot emphasize too strongly the importance of yearly full-mouth x-ray examinations for young people of college age. We are convinced that this procedure is just as important from high school age on through life or as long as teeth are retained.

After watching this work closely for the past ten years, we have come to the following conclusions:

1. The x-ray, diagnostic and educational work is more beneficial to the student than strictly restorative work.

2. Students, faculty and employes should return to their own dentists.

3. Nearly all of those at the college, after being advised, are having necessary work given attention.

We believe that this work should be started with young people of high school age rather than college age, when so much damage has occurred. We believe that if this type of work were done in all schools and business establishments, within a few years from 80 to 90 per cent, instead of from 20 to 30 per cent, of the people in the United States would be receiving effective dental service. This would not only render the public a more effective service, but would also result in much greater benefit to the dental profession as a whole.

Not a student at Carleton College would, I am convinced, be turned down for military service on account of the condition of his mouth. The dental phase of physical examination has never been more strongly impressed upon our profession and the general public than during the last two years. Statistics show that more than 20 per cent of the young men of the country have been turned down for service because of dental conditions.

Charles E. Lyght, M.D., and Caroline Helmick, M.D., and their associates of the Carleton College Health Service have cooperated wholeheartedly with the dental service.

Carleton College appreciates the cooperation of the dentists throughout the country who have rendered service to its students.

COUNCIL ON DENTAL THERAPEUTICS

LOCAL USE OF SULFONAMIDES

By F. D. OSTRANDER, D.D.S., M.S., and F. W. HARTMANN, M.S., Ann Arbor, Mich.

THE Council has authorized publication of this report as one in the series on pharmacology and therapeutics.

HAROLD L. HANSEN, *Secretary.*

SINCE the time of presentation of sulfanilamide as a chemotherapeutic agent, an enormous number of articles on this and related compounds have appeared in the literature. The characteristics of acceptable compounds of this group have been described in reports by the Council on Pharmacy and Chemistry of the American Medical Association and are listed in the book New and Nonofficial Remedies. General informative statements on these compounds appear also in Accepted Dental Remedies.

The pharmacology, toxicity and methods of assay of these drugs have been well worked out, and the sulfonamides now stand as a well-established part of our therapeutic armament. However, because most investigators have been primarily interested in the systemic administration of the drugs, the local or topical uses have remained largely unevaluated. It is with the evaluation of these drugs as used locally or topically that this review is concerned.

The first published description of the use of a sulfonamide locally was that of Jaeger[1] (1936), who used prontosil in salve form on a variety of dermatologic and vaginal lesions. He believed that prontosil could be thus used to great advantage, because, though it did not afford chemical disinfection, its use enabled the biologic mechanisms to deal more effectively with the infecting agent. Cuilleret[2] early reported using the drug topically in cases of streptococcic skin infections. He also had some experience with mixed streptococcic and staphylococcic lesions. In some cases, the drug was incorporated in an ointment. In others, a solution was used in the form of a wet dressing, the author reporting prompt disinfection of the lesions, with no irritation of the adjacent tissues.

One of the few satisfactory experimental approaches to the problem of local sulfonamide therapy is that of Jensen, Johnsrud and Nelson,[3] who produced experimental rib fractures in three series of guinea-pigs, and infected the lesions with a virulent culture of *Staphylococcus aureus* and sutured them. Of the control series of seven animals, 71.4 per cent showed infection. Of the second series of ten guinea-pigs, which had been treated by placing 0.5 gm. of sulfanilamide in the lesions, 20 per cent were infected. The third series, which received 0.5 gm. of the drug subcutaneously, had an infection incidence of 80 per cent. These workers point out that application of sulfanilamide to the lesion itself can produce a maximum concentration approaching 800 mg. per hundred cubic centimeters, whereas systemic administration gives a drug concentration rarely exceeding 15 mg. per hundred cubic centimeters. In thirty-nine cases of compound fracture and two cases of compound dislocation in human beings, these authors report that they had not a single case of infection. The treatment included thorough débridement, careful hemostasis and the introduction of 5-15 gm. of crystalline sulfanilamide, followed by

From the University of Michigan School of Dentistry.

primary closure of the skin. Subsequent treatment was applied to the fracture. Thomson[4] believes that his clinical experience in dealing with compound fractures justifies continuing the use of sulfanilamide locally, as well as orally as indicated. He recognizes the need for further experimental work on the problem of local sulfonamide therapy.

Favorable clinical reports have come from surgeons all over the country. Key,[5] in St. Louis, who has used sulfanilamide locally in clean operative wounds, advocates the use of sulfathiazole both locally and orally in the surgical treatment of pyogenic infections. Using sulfanilamide or sulfathiazole in the surgical treatment of thirteen acute mastoiditis cases, Livingston[6] has noted a shortened postoperative period, as well as primary healing in an increased percentage of cases. In the treatment of adult peritonitis cases, Thompson, Brabson and Walker[7] recommend the injection of 8 gm. of sulfanilamide intraperitoneally and of 4 gm. in the abdominal wall layers. During the year 1940, when this treatment was used in a relatively large number of critical peritonitis cases, these authors had a zero mortality rate. Herrell and Brown,[8] of the Mayo Clinic, believe that the best form of sulfonamide for topical application is a thick suspension made up in an isotonic salt solution. After using sulfanilamide and sulfathiazole locally in twenty-one infected lesions of the scalp, thorax, pericardium, abdomen and the sinuses, these men were sufficiently encouraged to continue this type of treatment.

War wound infection has become a matter of prime importance. An Englishman, Hawking,[9] has recommended that war wounds be guarded against gas gangrene by the use of sulfonamides locally, together with antitoxin injections. In his observations, he has noted that sulfathiazole is more effective for this purpose than sulfanilamide or sulfapyridine. Hawking believes that local application is of more value than systemic administration by the intraperitoneal route; also that a delay of even two hours in applying the drug results in a great loss of effectiveness.

A variety of methods for applying sulfonamides topically are described in the literature. Perhaps the method most widely used to date is the direct application of the dry crystalline compound. Colebrook and Francis[10] report good results in eliminating streptococci from superficial wounds by first cleaning the wound, then insufflating sulfanilamide powder into it and covering the area with saline-moistened pads. They use jaconet or oiled silk on the outside to retain moisture. These authors believe that sulfathiazole is less effective against streptococci, but report better results with this drug against *Pseudomonas pyocyanea (aeruginosa)* and *B. proteus.*

Sulfonamide solutions have had some trial also. Copeman,[11] speaking of postnasal catarrh, says, "A sulfanilamide spray or paint will be of value in streptococcal cases, in others dilute protargol." In view of the fact that no experimental or clinical data are given, this is not an impressive statement. Cosgrove[12] reports using an 0.8 per cent solution of sulfanilamide as an eyewash in the treatment of trachoma with good results. A similar treatment for gonorrheal conjunctivitis has been described by Rein and Tibbetts.[13] In this instance, a 0.5 per cent solution of sulfanilamide in normal saline was employed as an irrigating agent. Mayo and Miller[14] used an 0.8 per cent sulfanilamide solution, either as an irrigating fluid or in wet packs, after posterior resection or combined abdominoperineal resection for rectal carcinoma. The impression gained from this treatment was that it had worked where other drugs failed. The benefits reported were the appearance of healthy granulation tissue, the presence of cleaner wounds and the promotion of connective tissue growth. Dey,[15] working in Calcutta,

successfully employed sulfonamides in the form of 2.5 or 5 per cent solutions, as well as in an ointment base, in treating twenty cases of localized purulent lesions. This series included such lesions as boils, non-diabetic carbuncles, ulcers, abscesses and infected traumatic wounds, and cellulitis.

Ointments containing sulfonamides have claimed the attention of certain clinicians. One formula[16] which has been recommended for skin and mucous membrane surfaces contains sulfanilamide, sodium alginate, water, anhydrous wool fat and sodium chloride in a white petrolatum base. In treating sixty-nine cases of cutaneous infections such as infected eczema, seborrheic dermatitis, impetigo, acne vulgaris, bacterial folliculitis and furunculosis, Keeney, Pembroke, Chatard and Ziegler[17] employed a 5 per cent sulfathiazole ointment in which the drug was suspended in equal parts of hydrous wool fat and vanishing cream. No difference in clinical efficacy was noted when sodium sulfathiazole was substituted. Reinfection which occurred in some children with infantile eczema after a 5 per cent carbonis detergens ointment was substituted for sulfathiazole ointment was successfully treated by incorporating sulfathiazole in the carbonis detergens preparation. In addition to the cases already mentioned, sulfathiazole ointment was utilized in thirty-five acute vesicular poison ivy cases, thirty-three cuts and four small second degree burns. No infection was encountered.

An interesting method for handling pyogenically infected wounds has been devised by Veal and Klepser.[18] Their experience with 140 cases of this type indicated that sulfanilamide powder when placed directly in the well-debrided open wound was efficacious in controlling infection. However, they observed that a continued high concentration of the drug interfered with the growth of active, healthy granulation tissue. These workers then turned to 10 per cent sulfanilamide —2 per cent allantoin ointment. This preparation was used, after an initial treatment with sulfanilamide powder, for the purpose of holding the infectious inflammatory process in check and, at the same time, promoting the growth of granulation tissue. In their experience, this form of local therapy proved effective, and they believe that the method warrants further trials.

Most of the workers who have used some form of local sulfonamide therapy have considered the possibility of drug toxicity. The toxic symptoms, which frequently appear with systemic administration, are well known. After a limited experience with wound infections, Schneider[19] states that all the toxic manifestations from oral administration of a sulfonamide are also to be expected when local therapy is employed. This warning is applicable in certain special cases when a quantity of drug is placed in contact with a large, rapidly absorbing surface, but it is not in agreement with the consensus on this point. It is generally believed that drug toxicity is not an important consideration in local therapy, inasmuch as the blood concentration, if demonstrable at all, is very low. Keeney, Pembroke, Chatard and Ziegler[17] found in six of eight infants that had one-half of the body covered with 5 per cent sulfathiazole ointment three times daily a blood concentration of 2.0-3.5 mg. per hundred cubic centimeters. Other patients using the same ointment on restricted areas showed no detectable concentration in the blood.

Several investigators have studied the effect of sulfonamide therapy on the healing process. Key and Burford[20] did some experimental work on this problem, using both rabbits and dogs. Using fifteen rabbits, they found that local implantation of sulfanilamide crystals in an experimental fracture of the right foreleg did not interfere with the union, as compared to the degree of union present in the left foreleg, which had been simi-

larly fractured and which served as a control. Similar results were obtained with experimental lesions in dogs. In another report, Key, Frankel and Burford[21] expressed the belief, based on both clinical and experimental studies, that the local use of sulfanilamide does not damage the tissues significantly. They did note that such use of the drug sometimes gave rise to a collection of fluid and, in some cases, to a low-grade inflammatory reaction, neither of which was regarded as of serious significance. Bricker and Graham,[22] working with experimental stomach wounds in dogs, concluded: "Sulfanilamide, given to dogs (systemic administration) in doses comparable to the therapeutic doses used by human beings, has an inhibiting effect on the healing of uninfected incised wounds, as determined by the tensile strength." In this work, it was found that, by the seventh day after operation, the wounds of sulfanilamide-treated dogs were only slightly below those of the control dogs in tensile strength. As was previously pointed out, Veal and Klepser[18] found that a continued high concentration of sulfanilamide in a wound interfered with the growth of granulation tissue. Many clinicians have expressed the opinion that local sulfonamide therapy has no adverse effect on the healing process. Many others assert that the process is promoted directly by such treatment. But, in the light of the more careful investigations referred to above, it appears that the sulfonamide therapy may sometimes affect healing tissues adversely.

The mode of action of the sulfonamides on bacteria remains an open question. The opinions on the details of this process are numerous and divergent. It is generally agreed that the action *in vitro* of the various derivatives may vary from slight bacteriostasis to some degree of bactericidal activity, depending on a host of variable experimental conditions. Lawrence[23] observed bacteriostasis as the only demonstrable *in vitro* effect of sulfathiazole, sulfamethylthiazole and sulfaphenylthiazole under his particular test conditions. White,[24] working at Johns Hopkins University, has pointed out the need for accurate temperature control in studying the degree of activity of the various sulfanilamide derivatives. He observed that 100 times more sulfanilamide was needed to sterilize broth cultures of streptococci at 37° C. (98.6° F.) than at 39° C. (102.2° F.) The mode of action of the sulfonamides has been studied and reported upon by numerous other investigators, including Long,[25] Chandler and Janeway,[26] Gay, Clark, Street and Miles,[27] Shaffer,[28] Lockwood and Lynch,[29] Green,[30] Kalmanson[31] and Sevag and Shelburne.[32]

Certain substances of animal and bacterial origin decrease the ability of the sulfonamides to act on bacteria. MacLeod[33] has found that an inhibitor is always present in pus. This observation becomes important to the clinician in consideration of the fact that wound infections are frequently pyogenic. The same worker has noted that sulfonamide fastness, a phenomenon not infrequently seen in medical clinics after systemic administration, is accompanied by an increase in production of inhibiting substance by the bacteria. Another inhibitor, para-aminobenzoic acid, is being used by Janeway[34] and others in cultures from patients under sulfonamide therapy. This chemical inhibits whatever bacteriostasis may occur from the presence of small quantities of a drug, making the culture a more reliable index of the presence or absence of viable organisms.

Most workers who have used some form of local sulfonamide therapy in treating infected wounds have emphasized the necessity of preliminary cleansing and débridement. Further evidence that this is an essential part of the treatment technic is afforded by the work of Faulkner and Duncan,[35] who have studied the penetration of human blood clots by the drug. Using sulfanilamide,

sulfapyridine, sulfathiazole and sulfamethylthiazole put into solution in both an isotonic salt solution and human serum, these investigators demonstrated that even after 240 hours' exposure at body temperature, there was still no appreciable penetration of the suspended clot by any of the drugs. Obviously, the drug is not able to attack organisms protected from it by large amounts of tissue débris.

The question of dosage naturally enters into the problem of local therapy. Long,[36] after some encouraging clinical results with superficial infections, mentioned a daily dose of 0.1 gm. per square inch of exposed tissue. As Long points out, there is not as yet sufficient information to form a basis of definite recommendations regarding dosage.

It is only recently that medical research workers have shown a considerable interest in the field of local sulfonamide therapy. It is probable that increased interest in this field has been largely due to the outbreak of hostilities between many nations. As a consequence of this outbreak, medical men in many parts of the world are being confronted with wholesale injury and infection, and they are anxious to learn of improved therapeutic methods. With the passage of time, we will undoubtedly acquire many more experimental and clinical data. At present, most medical investigators share the opinion of Thrower,[37] of England, who believes that the whole problem of topical sulfonamide therapy stands in need of further critical study.

In the dental field, the sulfanilamide derivatives have been found of unquestioned value when administered internally in the more extensive infections of dental origin. However, the exact extent of their usefulness for local application in the region of the mouth remains to be defined. Many reports are found in the literature of their local use in sockets after extraction and in infected pulp canals; in compound fracture of the maxilla and mandible and in osteomyelitis of the maxilla or mandible, and in various therapeutic or prophylactic measures in or about the mouth. Unfortunately, some of these reports are based on far too few cases to be conclusive, and many of them have too few satisfactory controls to be convincing.

The Council on Dental Therapeutics has issued two reports on sulfanilamide, the first of which appeared in September 1938[38] and the second in June 1939.[39] Both of these articles were concerned with the internal administration of the drug, and many of the articles appearing in the dental literature are also concerned with its systemic application.

The first report on the local use of sulfanilamide in dentistry, published by Sinclair in November 1937,[40] was followed soon by another article in collaboration with Barker,[41] in March 1938. The authors used the drug in a powdered form in several types of oral lesions and reported favorable results in a case of compound fracture of the mandible, a case of osteomyelitis of the mandible and 250 cases of extraction following chronic periapical infection. In the extraction cases, a marked decrease in soreness and freedom from pain and dry socket were reported. Furthermore, it was stated that the presence of the powdered drug in the tooth socket did not interfere with normal healing. Apparently, there were no control cases. The authors reported no success when the drug was used in the treatment of Vincent's infection.

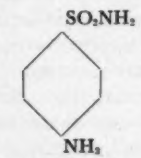
In these and other reports discussed here, the locally applied sulfonamides were probably not sterilized powders. There is evidence that the sulfonamides intended for local use should be sterile. They are being supplied in that form at present.

In further reports,[42, 43] Sinclair and Barker indicate continued success with the local use of sulfanilamide, and of sulfapyridine and sulfathiazole as well. They state that in no case have they

noted a local or general toxic effect when the drug was used locally. However, they do report some instances of delayed formation of granulation tissue, but they believe that any delay in healing is only temporary since postoperative x-ray films show a normal filling-in of bone. The authors' statement that a wound treated locally is nearer to an *in vitro* than an *in vivo* state would seem to require verification.

Sinclair and Barker have not observed any drug incompatibility when sulfanilamide was used with dentalone (stated to be a mixture of chloretone [chlorobutanol] in oil of cloves, cinnamon and sweet birch), anesthesin, iodine and subsulfate of iron. Since anesthesin is merely a trade name for ethylaminobenzoate (benzocaine), these observations do not agree with the report of Nevin.[44]

Nevin reports the work of Woods, Selbie and other English workers on the mode of action of sulfanilamide and its possible incompatibility with benzocaine. The English workers quoted theorize that since the structures of sulfanilamide and p-aminobenzoic acid are very similar, certain organisms which use the latter substance in their life processes will readily absorb sulfanilamide instead. This drug then inhibits the organism's metabolic processes and causes its eventual destruction. These observations of Woods and Selbie are supported by the previously mentioned use of p-aminobenzoic acid as an inhibitor by Janeway.[34]



Sulfanilamide

p-aminobenzoic acid

Ethyl p-aminobenzate (benzocaine)

These workers further point out the similarity in structure of ethylaminobenzoate, believing that when it is present, the organism may absorb a certain percentage of it instead of sulfanilamide, with consequent diminution of the effectiveness of the sulfanilamide.

Woods performed a series of *in vitro* tests which showed a positive inhibition of the bacteriostatic action of sulfanilamide when either p-aminobenzoic acid or ethylaminobenzoate was present. Selbie showed this effect also to be present *in vivo* by demonstrating that the protective action of sulfanilamide against *Streptococcus hemolyticus* in white mice was almost nullified by the concurrent injection of ethylaminobenzoate. Thus, on the basis of this work, the practice of using both ethylaminobenzoate and sulfanilamide in the tooth socket would seem irrational.

Adams reported early on the use of sulfanilamide in root-canal therapy.[45] The drug was used in a hot solution, being forced through the tooth and out through a fistula. If no fistula was present, one was made surgically. Of a small number of cases, all but one became negative after one such treatment. There were no controls and, as the author states, the report lacks conclusiveness because of the small number of cases and the possibility that the favorable results might have been partially due to the hot lavage rather than the action of the sulfanilamide. Furthermore, most dentists will not be inclined to adopt a technic which requires surgical intervention to form a fistula.

In a second article, the author[46] states, "There is reason to believe that a variety of bacterial infections can be successfully treated locally with a combination of artificial heat and sulfanilamide." In

support of this statement, the results of a series of *in vitro* experiments are presented in which the bactericidal and bacteriostatic properties of sulfanilamide were tested by exposing cultures of organisms from periapical areas, infected pulp canals and pyorrhea pockets to the action of the drug at various temperatures and concentrations and for periods of time ranging from ten to sixty seconds. A series of controls were exposed only to hot distilled water. Under the conditions of this experiment, a ten second exposure to a 6 per cent solution of sulfanilamide in distilled water at a temperature of 135° to 140° F. was sufficient to kill the organisms used. Hot water at the same temperature proved bactericidal in some instances, and there was indication of bacteriostasis in all instances. A saturated solution of sulfanilamide at 120° F. was not bactericidal, but was bacteriostatic after sixty seconds' exposure. A 3 per cent solution at 140° F. delayed growth, but was not bactericidal. Of the bacteria groups, the staphylococcus seemed most resistant to the action of sulfanilamide.

There are few data presented and the author frankly states that the article is presented "in the hope that it will stimulate further interest in the possibilities of the local use of hot concentrated solutions of sulfanilamide."

In a third report,[47] Adams, in outlining his technic in detail, states that most cases will show two successive negative cultures after four treatments. No statistical data are given and no control cases are presented. For comparison, a recent survey of 847 root-canal cases treated in the clinic of the University of Michigan School of Dentistry[48] shows that those infected cases with a normal peridental membrane required an average of 3.44 treatments to obtain two successive negative cultures, whereas those diagnosed roentgenographically as chronic proliferative periostitis required an average of 3.46 treatments, and granuloma cases required 3.66 treatments. No sulfonamide drug was used in these treatments, and this again emphasizes the necessity for the employment of adequate controls in such studies. Obviously, the control cases must be concurrent and conducted under conditions similar to those applying to the cases in which the medicament is employed.

Belding and Belding[49] reported in December 1939 on a series of five *in vitro* experiments, from which they concluded that sulfanilamide possesses no bactericidal properties, but is bacteriostatic by virtue of preventing the activation of the bacterial proenzymes. They suggest that the inhibitory action of sulfanilamide in all bacteriologic reactions is achieved by a relatively nonspecific inhibition of enzyme activation. The work was too limited in scope to be conclusive.

Zaus,[50] in a report published in October 1939 and covering the general action of sulfanilamide, referred to its local use as of unproved value and advised critical evaluation of its results.

In an article devoted largely to discussion of the mode of action of sulfanilamide, Fleming[51] says, "Local administration has little hope of success," basing his opinion on the fact that most areas in which it would be desirable to apply sulfanilamide locally would be filled with large masses of organisms and pus cells, and some of these cells would break down, with the release of tryptic ferments, which, in turn, would act on all the proteins present to produce peptones. Since, the author states, he has shown that peptones and large masses of bacteria act to depress the antibacterial action of sulfanilamide, he believes that local application is not indicated. It would seem that this objection might be ruled out by a thorough cleansing before application. However, he presents some *in vitro* experiments which indicate a certain degree of bacteriostasis when sulfanilamide solutions are applied locally to agar plates inoculated with *Streptococcus pyogenes.*

Hyde[52] describes a number of cases in

which sulfanilamide was used simultaneously by mouth, by injection and locally, with good results. However, the fact that the drug was used by so many routes gives little chance for evaluation of the local application. He also reports the use of the drug locally in 114 cases of dry socket. The socket was thoroughly cleansed with a warm isotonic salt solution and all necrotic tissue, clot and spicules of bone were removed. Ten grains of sulfanilamide was made into a paste with neoprontosil and the paste was inserted in the socket on iodoform gauze. Hyde reports marked diminution of pain and rapid initiation of healing.

Several investigators have reported on the application of sulfonamides in various forms of gingival infection. Mewar[53] reports the successful use of urea sulphazide (said to be a urea salt of 4-sulfamidobenzene azo-1-hydroxy-7-acetylamino-naphthalene-3:6 disulfonic acid) in twenty-five cases of pyorrhea. All calculus was first removed from the teeth and the surfaces were polished. A 10 per cent solution of urea sulphazide was then put in each pocket and allowed to stay for five minutes. A 10 per cent paste of urea sulphazide was then packed in the pockets with a blunt instrument and the patient was dismissed. The patient was also provided with a 10 per cent urea sulphazide ointment to be used between appointments. No control cases are reported, and without them it would be difficult to determine whether the improvement was due to the removal of calculus and improved hygiene or to the action of the drug. Mewar believes that pyorrhea is a polymicrobic infection with the streptococcus predominating, *Streptococcus pyogenes* and *Streptococcus viridans* being largely responsible. Certainly, many periodontists will not agree with this theory of its etiology.

Knebelman[54] has treated acute cases of gingival irritation by flushing out the interproximal spaces with a warm salt solution and then applying a thick paste of sulfanilamide powder to the affected area. The excess water is absorbed with cotton and the paste is covered with a one-half by 2 inch piece of adhesive dry foil, which is burnished to place with a cotton roll and is retained by the interproximal spaces. The treatment is left in place for from three to four hours and repeated twice a day. Not more than from 20 to 25 grains a day is used to prevent any possible systemic toxicity. In the few cases presented, the results were said to be almost unbelievable. In chronic cases, the treatment is similar except that it is preceded by thorough prophylaxis and the interproximal spaces are flushed with hydrogen peroxide.

Knebelman states that sulfanilamide powder applied topically in a proper manner is almost a specific for destroying spiral organisms and fusiform bacilli in the oral cavity. This is not corroborated by the findings of most investigators and one wonders what effect the use of other mild antiseptics might have had in similar packs.

In contrast to the glowing reports of Mewar and Knebelman, Rantz,[55] after reviewing the available data on the sulfonamide compounds, concludes: "They are almost certainly without useful effects in Vincent's disease, pyorrhea and aphthous stomatitis." However, he does believe that "local applications may tend to prevent certain post-extraction complications, and while the course of the disease may not be altered, they deserve a clinical trial in cases of osteomyelitis of the jaw."

In an article dealing with both the systemic and the local use of sulfanilamide in dentistry, Kruger[56] is critical of the extravagant claims of certain authors, but believes the drug to be of value when applied locally in certain selected cases.

Dent[57] advises the use of sulfanilamide in a wide variety of conditions: (1) dry socket, (2) extraction of teeth, (3) postoperative pain following surgical treatment of pyorrhea, (4) flow of pus in

osteomyelitis of the jaws, (5) aphthous stomatitis, (6) postoperative pain, and as promoting healing, after alveolectomy, (7) fracture, (8) cellulitis, (9) as a prophylactic in the presence of heart lesions when extraction is necessary and (10) as a prophylactic against a possible flare-up of an old infection.

Dent states that the drug acts as an analgesic and is not toxic when applied locally. His experience with the drug in a variety of cases is given, but no specific data are presented.

As might be expected, the greatest number of articles thus far contributed to the dental literature are concerned with the topical application in extraction sockets. DeWolf[58] reports on postoperative treatment of 100 extraction cases in which fifty were treated with sulfanilamide and a guaiacol-glycerin solution and fifty received no postoperative treatment. After extraction, the socket was swabbed and a paste of 2 grains of sulfanilamide with distilled water was inserted and covered with a pledget of cotton moistened with a 10 per cent solution of guaiacol in glycerin. This treatment was repeated in twenty-four hours. In the control cases, the patients bit down on a cotton plug to stop hemorrhage and were allowed to wash the mouth out with a hot saline solution after two hours. In the sulfanilamide-treated cases, only four cases of dry socket developed and pain and soreness were relieved. Healthy granulation tissue was noted after twenty-four hours. Among the control cases, eighteen developed dry socket and suffered pain from two to three weeks. The author states his opinion that neither sulfanilamide alone nor guaiacol and glycerin alone are so effective as the combination. However, this would seem to require confirmation.

The number of cases of dry socket developing in both groups of DeWolf's study seems high when compared with the figures of Archer.[59] In an analysis of 23,886 extraction cases, Archer reported one dry socket in every 105 cases, or less than 1 per cent. Archer further reported that sealing of sulfanilamide in fifty dry sockets reduced the time of treatment by 50 per cent.

Lanier[60] used sulfanilamide in 6,000 extraction cases, alveolectomies and surgical pyorrhea treatments. He treats extraction sockets with a 1-grain cone of the drug. He states his results as follows: (1) no toxic manifestations, (2) no complications, (3) reduced postoperative treatments, (4) virtual elimination of dry socket and of postoperative pain.

Norris, Weimer and Yalisove[61] state that local application of sulfanilamide has eliminated much postoperative pain, kept edema to a minimum and prevented dry socket, and has been a valuable aid in root-canal therapy. The extraction cases were treated by first bathing the socket with tincture of metaphen and then filling the socket with powdered sulfanilamide. Sutures were used to close the socket where indicated; otherwise, it was protected by a small pack of iodoform gauze. The authors conclude: "The fact that no severe oral infection such as cellulitis, osteomyelitis, or dry socket has occurred in the hospital with this treatment shows definite significance in the local application of sulfanilamide." However, the fact that there is no comparison with cases treated in other ways leads to the question as to what part the metaphen wash and iodoform pack may have played in the prevention of postoperative infection.

Krashen[62] reports a series of sixty uncomplicated extraction cases divided into three groups of twenty each. One group was used as controls, receiving no medication; the second group was given sulfanilamide internally, and the third group received the drug locally in the extraction socket. The same anesthetic solution was used in all instances. The condition of the tissues was carefully noted before the extraction and postoperatively after twenty-four and forty-eight hours.

Krashen reports the oral administration as of little or no value, and certainly not of a value sufficient to offset the possible toxic effects. He further found that the use of sulfanilamide in the alveolus increased pain and retarded granulation and healing, and he expresses the opinion that it acted as an insoluble foreign body. While this article would seem to be one of the more careful observations on the subject, Krashen acknowledges the small number of cases in his report, emphasizing the need of further controlled studies to determine the actual value of the local use of sulfanilamide.

Krashen's and Sinclair's and Barker's clinical observations of delayed formation of granulation tissue is supported by the recent work of Glynn[63] and Bick.[64] The former studied the effect of sulfanilamide, sulfathiazole and sulfapyridine therapy on the healing wound by the insertion of a small rabbit-blood clot in the subcutaneous tissue of each side of the rabbit haunch. On one side, 0.25 gm. of the substance being tested was inserted, while the other wound was closed without introduction of the drug, thus serving as a control. The animals were killed at one, two, three, five, seven and fourteen day intervals and sections were prepared of the tissue about the wounds.

It was shown that a slight inhibition of fibroblast proliferation resulted from the action of the sulfathiazole and sulfapyridine, but not of sulfanilamide; and sulfanilamide, and, to a lesser extent, sulfapyridine, therapy had a slight toxic effect on striped muscle. In no case were the reactions sufficient to contraindicate the local application of these drugs.

Bick reports a serious inhibition of healing and an increase in scar-tissue formation in operative and traumatic wounds of the soft tissues treated with sulfanilamide and sulfathiazole. Fifty cases were treated by a standard technic including the use of powdered sulfanilamide or sulfathiazole in quantities varying from 1.5 to 10 gm., and sufficient to cover all surfaces of the wound. Fifty control cases were treated with the same technic except that the sulfonamide was omitted. Progress of healing was charted daily until complete in both groups. The records show a delay in healing representing on the average from 50 to 75 per cent of the time factor when either sulfanilamide or sulfathiazole was used. In view of this fact, Bick believes that unless infection is expected in a wound, topical sulfonamide therapy is not indicated. However, in cases of contaminated wounds, he believes it to be almost obligatory.

One of the most comprehensive reports to appear thus far in the dental literature is that of Stern,[65] who describes a series of well-controlled treatments of seventeen dry sockets, eighty-one impacted third molar wounds, 347 ordinary extractions and a series of contaminated wounds of the maxilla. The results, which are tabulated meticulously, show a distinctly favorable clinical effect in those cases in which the sulfonamides were used. Stern reports slightly superior results for sulfanilamide, although sulfapyridine and sulfathiazole were both effective. The most noteworthy results of sulfonamide therapy appeared to be reduction of postextraction pain, of constitutional reaction in the form of a rise in temperature and of the period of required postoperative treatment. This is in contrast to the observations of Krashen, who noted increased pain and swelling and a slowing of granulation when sulfanilamide was used. Stern found no systemic reactions in his series of nearly 500 cases, but noted a slight tendency to increased secondary hemorrhage. He emphasizes the fact that the efficacy of the local use of the sulfonamides cannot be finally evaluated until there is closer agreement in the reports of various workers.

Goodsell[66] states that bone defects measuring 1 cm. in diameter or larger should be filled with sulfathiazole and the soft tissues should be sutured over the

opening. If the tissues cannot be sutured, the sulfathiazole is covered with medicated gauze dressings. In deep piercing wounds of the soft tissues, gauze is impregnated with a thin paste of sulfathiazole in distilled water and inserted in the depths of the wound after thorough débridement. The drug is also used in powdered form in compound fractures. No statistical data are presented to support its effectiveness in any of the conditions mentioned.

In an article discussing the local use of sulfathiazole, Meachem and Osgood[67] report its local use in several cases of cellulitis, osteomyelitis, a follicular cyst of the ramus and mandible and a radicular cyst of the mandible, as well as more than 100 cases of impaction and nearly 300 cases of uncomplicated extraction. Any pus in the area being treated was washed out with a suspension of sulfathiazole in an isotonic salt solution. The drug was applied in the infected or injured areas either in the powdered form or mixed with a water soluble lubricating base or suspended in chemically pure glycerin. In some of the extraction wounds, it was used in connection with ethylaminobenzoate. Results reported, particularly in the cases of cellulitis and osteomyelitis, are indicative of local effectiveness, but they are relatively few and are not supported by control cases. In the extraction and the impaction cases, less pain, swelling and infection were reported, but again these conclusions were unsupported by comparison with cases in which no sulfathiazole was used.

Others who have reported clinical success with the local application of the sulfonamides in dentistry include Kayne,[68] Gwinn,[69] Moss[70] and Barab.[71]

As yet no data have appeared in the dental literature on the newer derivatives of sulfanilamide: sulfaguanidine and sulfadiazine. It is probable that more will be heard of these compounds since early reports on the latter indicate a wider effectiveness among bacteria groups than any of its predecessors have possessed.

While there is no desire on the part of the reviewers to detract in any way from the interest, initiative and often careful observations of those who have thus far contributed to the literature on the local use of the sulfonamides, it still must be apparent to the reader of this report that the present data are in many ways inadequate for a final or even accurate tentative evaluation. In many instances, the articles presented have proved to be largely a recitation of personal clinical experience with conclusions based upon such criteria as presence or absence of pain, the postoperative condition of the tissues, rapidity of healing and other "patient reactions" which are influenced by so many variables as to make their analysis extremely difficult. Such data are important and useful to the clinician, but hardly a basis for final scientific evaluation of a drug. In several instances, a sulfonamide has been administered concurrently by two or more routes, this making it impossible to differentiate results as due to either systemic or local action, or, as is more probable in these instances, to a combination of the two. Also, other drugs are often found to be used concurrently with the sulfonamides, this fact again making questionable the assignment of results strictly to the use of a sulfonamide. Perhaps the most glaring fault with most of the data presented is the fact that in only a few instances has there been any attempt to compare results with those in control cases which have received no medication. However hard a clinician may try to be objective in his conclusions, he or his patient is too often affected by wishful thinking if his observations are not very carefully controlled. Tainter and Moose,[72] in connection with their work on local anesthetics, have repeatedly pointed out the extent to which one may be affected by preconceived ideas or desires unless data

are obtained by carefully controlled experimentation.

When a new drug or drug group is first used clinically, it is naturally expected that there will be some variation of opinion in the early reports regarding its effectiveness. However, the reports to date on the local use of the sulfonamides, particularly in the field of dentistry, have been extremely variable and, in many cases, actually contradictory. The distinctly contradictory results of Krashen and Stern have been pointed out. Fleming states that local application has little chance of success, whereas Sinclair and Barker, DeWolf, Lanier, Norris, Wiemer and Yalisove and others give glowing reports of successful application in a variety of conditions.

In the field of the periodontist, Sinclair and Barker report no success when sulfanilamide is used in Vincent's infection, and Rantz states that the sulfonamides are almost certainly without value in Vincent's infection, pyorrhea and aphthous stomatitis. In contrast to these opinions, Knebelman and Mewar report successful use of sulfonamides in peridental disease.

Sinclair and Barker report that they have observed no drug incompatibilities when the sulfonamides are used; many other reports tell of the use of sulfanilamide with ethylaminobenzoate, and Nevin reports them incompatible. There is little agreement as to the effect of the drug on the healing socket, and the amounts to be applied in a tooth socket range from the 1-grain cone suggested by Lanier to the "filling of the socket" with 10 grains or more.

To summarize, the present data on the local uses of the sulfonamides are characterized by the following deficiencies: 1. Lack of adequate controls. 2. The use of subjective rather than objective criteria. 3. Frequent combination of therapeutic agents. 4. Reports based on an insufficient number of cases.

In the dental field, further controlled observations of the type presented by Krashen and Stern would seem desirable, particularly if they can be made in institutions where sufficiently large numbers of cases are available to be of statistical importance. A further exploration of the possibilities of the drug group in the disinfection of infected root canals and periapical areas would seem indicated, preferably to be carried out in institutions where large numbers of cases are available, along with comparative data for other root canal antiseptics.

Some frankly experimental work seems necessary to finally determine the effect of sulfonamide therapy on the healing of the extraction socket. No doubt, animal work as well as clinical observations will be necessary with the histopathologist and therapist cooperating in the study. The dosage of the drugs to be applied in a socket needs clarifying. There is some possibility that cases of delayed healing that have been reported may have been due to the presence of an excessive amount of the drug in the socket.

Although its possibilities seem less promising than in some other fields, a well-controlled study of the application of the sulfonamides in peridental disease would be of value. Even though it did nothing more than lend scientific support to those who feel these drugs to be of no value in this field, it would still be a highly desirable clarification of a controversial point.

BIBLIOGRAPHY

1. JAEGER, K. H.: *Deutsche med. Wchnschr.*, 62:1831, November 6, 1936.

2. CUILLERET, P.: *Bull. Soc. franc. de dermat. et syph.*, 44:1178, July 1937.

3. JENSEN, N. K.; JOHNSRUD, L. W., and NELSON, M. C.: *Surgery*, 6:1, July 1939.

4. THOMSON, J. E. M.: *J.A.M.A.*, 115:1857, November 30, 1940.

5. KEY, J. A.: *J.A.M.A.*, 117:409, August 9, 1941.

6. LIVINGSTON, G. S.: *J.A.M.A.*, 117:1081, September 27, 1941.

7. THOMPSON, J. E.; BRABSON, J. A., and WALKER, J. M.: *Surg., Gynec. & Obst.*, 72: 722, April 1941.

8. HERRELL, W. E., and BROWN, A. E.: *Proc. Staff Meet. Mayo Clin.*, 15:611, September 25, 1940.

9. HAWKING, F.: *Brit. M. J.*, 1:263, February 22, 1941.

10. COLEBROOK, L., and FRANCIS, A. E.: *Lancet*, 1:271, March 1, 1941.

11. COPEMAN, W. S. C.: Treatment of Rheumatism in General Practice. Baltimore: Williams and Wilkins, 1939, p. 3.

12. COSGROVE, K. W.: *Am. J. Ophth.*, 23: 911, August 1940.

13. REIN, W. M., and TIBBETTS, O. B.: *Am. J. Ophth.*, 22:1126, October 1939.

14. MAYO, C. W., and MILLER, J. M.: *Proc. Staff Meet. Mayo Clin.*, 15:609, September 25, 1940.

15. DEY, A. C.: *Indian M. Gaz.*, 75:161, March 1940.

16. Queries and Minor Notes: *J.A.M.A.*, 116:356, January 25, 1941.

17. KEENEY, E. L., et al.: *J.A.M.A.*, 117: 1415, October 25, 1941.

18. VEAL, J. R., and KLEPSER, R. G.: *Med. Ann. District of Columbia*, 10:61, February 1941.

19. SCHNEIDER, L.: *Am. J. Med., Sc.*, 201: 208-215, February 1941.

20. KEY, J. A., and BURFORD, T. H.: *South. M. J.*, 33:449, May 1940.

21. KEY, J. A.; FRANKEL, C. J., and BURFORD, T. H.: *J. Bone & Joint Surg.*, 22:952, October 1940.

22. BRICKER, E. M., and GRAHAM, E. A.: *J.A.M.A.*, 112:2593, June 24, 1939.

23. LAWRENCE, C. A.: *Proc. Soc. Exper. Biol. & Med.*, 43:92, January 1940.

24. WHITE, H. J.: *J. Bact.*, 38:549, November 1939.

25. LONG, P. H.: *Sigma Xi Quart.*, 29:149, October 1941.

26. CHANDLER, C. A., and JANEWAY, C. A.: *Proc. Soc. Exper. Biol. & Med.*, 40:179, February 1939.

27. GAY, F. P., et al.: *J. Exper. Med.*, 69: 607, May 1939.

28. SHAFFER, P. A.: *Science*, 89:547, June 1939.

29. LOCKWOOD, J. S., and LYNCH, H. M.: *J.A.M.A.*, 114:935, March 16, 1940.

30. GREEN, H. N.: *Brit. J. Exper. Path.*, 21:38, February 1940.

31. KALMANSON, G. M.: *J. Bact.*, 40:817, December 1940.

32. SEVAG, M. G., and SHELBURN, M.: *J. Bact.*, 46:68, January 1942.

33. MACLEOD, C. M.: *J. Exper. Med.*, 72: 217, September 1, 1941.

34. JANEWAY, C. A.: *J.A.M.A.*, 116:941, March 8, 1941.

35. FAULKNER, J. M., and DUNCAN, C. N.: *J. Clin. Invest.*, 19:785, September 1940.

36. LONG, P. H.: *Canad. M. A. J.*, 44:217, March 1941.

37. THROWER, W. R.: *Lancet*, 1:67, January 18, 1941.

38. KANTHAK, F. F., and PICKERING, P. P.: Sulfanilamide: Review of Clinical and Experimental Work on Its Therapeutic Properties. J.A.D.A., 25:1474, September 1938.

39. Council on Dental Therapeutics: Sulfanilamide. J.A.D.A., 26:987, June 1939.

40. SINCLAIR, J. A.: *Canad. D. A. J.*, 3:571, November 1937.

41. SINCLAIR, J. A., and BARKER, O. C.: *Am. J. Orthodontics*, 24:266, March 1938.

42. SINCLAIR, J. A.: *Bull. N. Carolina D. Soc.*, 23:16, January 1940.

43. SINCLAIR, J. A., and BARKER, O. C.: *New York J. Dent.*, 11:280, July-August 1941.

44. NEVIN, M. I.: *D. Items Int.*, 63:537, June 1941.

45. ADAMS, F. R.: *D. Items Int.*, 61:652, July 1939.

46. *Idem: D. Items Int.*, 62:315, April 1940.

47. *Idem: D. Items Int.*, 63:329, April 1941.

48. OSTRANDER, F. D.: Unpublished report.

49. BELDING, P. H., and BELDING, L. J.: *D. Items Int.*, 61:1143, December 1939.

50. ZAUS, E. A.: *Northwestern Univ. Bull.*, 39:3, October 1939.

51. FLEMING, ALEXANDER: *Proc. Roy. Soc. Med.*, (Sect. Odontology), 33:127, January 1940.

52. HYDE, W. H.: *D. Outlook*, 27:79, February 1940.

53. MEWAR, S. P.: *Indian D. J.*, 15:2, April, May, June 1940.

54. KNEBELMAN, A.: *D. Items Int.*, 62:716, August 1940.

55. RANTZ, L. A.: *Contact Point*, 18:68, November 1940.

56. KRUGER, G. O.: *Georgetown D. J.*, 9:13, December 1940.

57. DENT, BENJAMIN: *D. Items Int.*, 46:137, April 1940.

58. DEWOLF, A. J.: Use of Sulfanilamide and Guaiacol Glycerine Solution. J.A.D.A., 27:324, February 1940.

59. ARCHER, W. H.: *J. D. Res.*, 18:256, June 1939.

60. LANIER, W. D.: *Med. Bull. Vet. Admin.*, 17:57, July 1940.

61. NORRIS, W. H.; WIENER, J. A., and YALISOVE, I. L.: *Delaware M. J.*, 12:118, May 1940.

62. KRASHEN, A. S.: Preliminary Report on Use of Sulfanilamide in Average Extraction Case. J.A.D.A., 27:1199, August 1940.

63. GLYNN, L. E.: *J. Path & Bact.*, 53:183, September 1941.

64. BICK, E. M.: *J.A.M.A.*, 118:511, February 14, 1942.

65. STERN, LEO: *J. D. Res.*, 20:143, April 1941.

66. GOODSELL, J. O.: *J. Mich. S. D. Soc.*, 23:89, April 1941.

67. MEACHAM, P. L., and OSGOOD, E. E.: Efficacy of Local Use of Sulfathiazole Powder in Dentistry and Oral Surgery. J.A.D.A., 28: 1640, October 1941.

68. KAYNE, C. B.: Sulfanilamide Therapy Pertaining to Dentistry. J.A.D.A., 28:105, January 1941.

69. GWINN, C. D.: *J. California D. A.*, 17: 83, May-June 1941.

70. MOSS, R. W.: Local Use of Sulfanilamide in Dental Practice. J.A.D.A., 28:1966, December 1941.

71. BARAB, B. B.: *D. J. Australia*, 12:617, October 1940.

72. GORDON, S. M.: Dental Science and Dental Art: Philadelphia: Lea & Febiger, 1938, chap. XX.

ACCEPTED DENTAL REMEDIES

The Council on Dental Therapeutics of the American Dental Association announces the inclusion of the following articles in the list of Accepted Dental Remedies.

DENTIFRICES*

Merrit Brand Tooth Paste: Composition: See Comfort (Brand) Tooth Paste (A.D.R. Ed. 7, p. 106).

Manufactured by The Comfort Manufacturing Co., Chicago, Ill. Distributed by National Toilet Company, Paris, Tenn.

Francoise Tooth Powder: Composition: See Stevens-Wiley Tooth Powder (J.A.D.A., 28:2056, December 1941).

Manufactured by the Stevens-Wiley Mfg. Co., Inc., Philadelphia, Pa. Distributed by Francoise Products Co., Cincinnati, Ohio.

Mutual Tooth Powder: Composition: See Stevens-Wiley Tooth Powder (J.A.D.A., 28:2056, December 1941).

Manufactured by the Stevens-Wiley Mfg. Co., Inc., Philadelphia, Pa. Distributed by Mutual Coffee Company, Canton, Ohio.

Admission of an article to the list of Accepted Dental Remedies does not imply a recommendation. Information regarding the rules and work of the Council will be sent on request.

HAROLD L. HANSEN, *Secretary.*

*A.D.R. Ed. 7, p. 102.

COUNCIL ON DENTAL EDUCATION

AT the meeting of the American Association of Dental Schools held in New York City in March, Samuel P. Capen, chancellor of the University of Buffalo, read a discriminating paper upon "The Place of Medical Sciences in Dental Education." Chancellor Capen's long and intimate contact with professional education and his keen powers of analysis enabled him to invest his paper with timely interest, not only to dental educators, but also to all dentists who are concerned in the scientific development of dental practice. The Council on Dental Education feels that many readers of THE JOURNAL will find this paper of unusual interest.

HARLAN H. HORNER, *Secretary.*

THE PLACE OF MEDICAL SCIENCES IN DENTAL EDUCATION

By SAMUEL P. CAPEN, Buffalo, N. Y.

As a foundation for the discussion of the subject I have chosen, I should like to present a few general observations.

The primary function of the modern university, as was true of the medieval university, is professional education. Except for theological education, professional education has been entrusted to American universities only in comparatively recent times. From Colonial days until well into the nineteenth century, professional practitioners in the United States received their preparation through apprenticeship. To a certain extent, this is still the case. The older professions dealing with the health of the people, namely, medicine, dentistry and pharmacy, no longer admit new members who have not passed through professional schools. But it is still possible to enter the law with no other training than that gained through apprenticeship; and the newer professions commonly recruit a large percentage of their members from among persons who have had only practical experience and no specialized instruction.

Professional education is compounded of theory and practice. It has tended to gravitate toward the universities because the universities are society's instruments for formulating, enlarging and imparting theory. The principal defect of the apprenticeship method of training is that it does not provide the individual with sufficient opportunities for learning the underlying principles of his craft, and hence for acquiring the means for self-criticism and intellectual growth. But, of course, the mastery of the technics of a profession is essential for every practitioner. These can be learned only through practice, that is, through some form of apprenticeship. The apprenticeship may consist of participation in actual professional situations under the direction of an experienced practitioner, or it may be an artificial apprenticeship in which such situations are simulated within the walls of an educational institution. Certain laboratory or shop exercises connected with the courses in engineering, medicine, dentistry and other professions which are based upon the natural sciences are examples of these simulated situations.

*Read before the American Association of Dental Schools, New York, March 16, 1942.

The perennial question in all branches of professional education is: What shall be the proportion of theory to practice? To this question, there is no sure or permanent answer. Professional schools tend to oscillate between the extremes of policy. Now theory is emphasized at the expense of practice. Now the practical aspects of professional training are stressed, perhaps at the expense of theory. In general, however, as responsibility for educating the practitioners of any profession has come to rest exclusively upon the universities, the theoretical foundations have tended to occupy a larger and larger place in the curriculum.

The fundamental theory underlying any profession is the product of investigation. Although art is an important element in the practice of a profession, every profession rests on science. Until it has a scientific base, no occupation can properly be described as a profession. The inveterate tendency of science—all science—is to proliferate. It is always adding to itself, always changing shape. It is, in the main, the scientific or theoretical core around which each profession is built that furnishes the impulse for growth and change and progress. In other words, it is that central portion of professional training which universities alone can provide, namely, the theoretical portion, that has been the chief agent in the phenomenal improvement of professional standards and performance during the present century. The reason for this is that the most extensive and the most fruitful research has been carried on in the basic sciences underlying each profession. And the results of research have ultimately been carried over into the ordinary work of the practitioner, often altering it radically.

These general propositions regarding professional education as conducted through universities have—if you will admit that they are accurate—certain obvious applications to dental education in its present stage of development. I have once or twice stated publicly that dentistry is the only old and important profession in which the United States is preeminent. If we can claim equality with other nations in law and medicine and pharmacy and engineering, that is as much as we can claim. Many students are unwilling to concede that we have yet reached as high a level as several other countries in these professional callings. But about our superiority in dentistry there is no debate, in this country or abroad. This fact must be a source of deep pride not to the members of the dental profession alone, but to all thoughtful Americans.

I have often wondered how American dentistry came to achieve this enviable position. You may be unwilling to accept the explanation which seems logical to me. Nevertheless I offer it for what it may be worth. I attribute the superiority of American dentistry to two facts. One is what appears to be the peculiar aptitude of our people for mechanical operations. This aptitude can be in no sense racial, since we are of the most varied racial origins. It must be a product of our environment; of the interests which the problems of our environment have spread widely among our people, of the absence of specialized and hereditary classes, of the ideal of versatility which has always been a characteristically American ideal.

The other fact which I believe has contributed to the outstanding position of American dentistry is its autonomous status. Although dentistry may be in essence a specialty inside the general field of medicine, it has not developed as such. Medicine repudiated it a century ago. That was a sorry decision for medicine, one for which it is still paying the penalty. But as it has turned out, it was a fortunate decision for dentistry. In other lands, dentistry has grown up under the auspices of medicine, to a large extent overshadowed by medicine. In the United States, the leaders of dentistry,

thrown back upon their own resources, have been obliged to develop an independent profession, to fight for its recognition, and to devote themselves to its improvement. The profession has had to win distinction solely through the efforts of its own members. These circumstances have undoubtedly applied a stimulus which the profession would have lacked if it had remained as a subordinate branch of an older and more strongly established professional calling.

In recent years, some persons have believed that it would be both possible and desirable to merge dentistry with medicine. A few leaders of the medical profession have thought so. Even a few leaders in dentistry have held the same opinion. From the point of view of logic, it is an attractive thesis. Dentistry is as much a specialty of medicine as urology or otolaryngology. The body is a single biologic unit and the mouth is a part of it. Why should there be two separate professions, each concerned with a fraction, large or small, of the total organism? So runs the logical argument.

In spite of logic, however, I am persuaded that the two professions will not be merged in America within any period of time that we can now foresee, perhaps never. Dentistry is too firmly entrenched. The members of the profession are too numerous. It has won standing with the general public. It has too heavy an investment in schools for the preparation of future practitioners. It has imbued its members with so ardent a guild loyalty that the vast majority of them would tolerate no suggestion which would impair the complete independence of their calling.

But if there is no prospect of the amalgamation of dentistry with medicine, there is every reason for a closer association between them. The growth of cooperation between the two professions during the last two decades has been a most wholesome and welcome development. I believe that the movement is just at its beginning and that it will gather momentum as the years pass.

Some members of dental faculties may have been discouraged by what has seemed to them the snail-like advance of dental education toward higher standards. Accrediting committees may have been impatient that it has taken so long to effect reforms which have seemed to them essential. If the matter is viewed in full historical perspective, however, there is slight ground for either discouragement or impatience. In no other area of higher education has there been such phenomenal progress as in those branches of professional education which prepare practitioners for the health services. If we compare the requirements and the offerings of schools of medicine, dentistry, pharmacy and nursing thirty years ago with the requirements and offerings of the same institutions today, it is difficult to believe that so great a transformation could have been wrought within one short generation.

Medical education led the way with a drastic reconstruction of requirements for admission and graduation, with a comprehensive reorganization of the curriculum, with the provision of full-time teaching staffs, and with extensive improvement of physical facilities. Since the changes brought about in medical education were so spectacular and so well advertised, and since it was the first branch of professional education to be thoroughly reformed, public attention has been focused on what has happened in this field, and equally remarkable advances elsewhere have been ignored. For example, who, except the pharmacists, remembers that in less than twenty years both the quantitative and the qualitative standards of pharmaceutic education have shown an even greater advance? Dental education is in a similar case. Therefore, if you find yourselves in need of encouragement, think back over your recent history, think back to the conditions commonly prevailing even at the

time of the publication of the Gies report fifteen years ago.

The several steps in your own progress are more familiar to you than to me, and I shall not attempt to review them for you. I recognize that the improvements made by the dental schools, with the support of the profession, have concerned predental education, instruction in the basic medical sciences, clinical instruction, hospital relationships, and cooperation with medical schools. I shall offer a few observations on one phase of dental education only, namely instruction in the medical sciences.

I put to you a simple if dogmatic proposition. The medical sciences have been the chief motivating agent in the recent remarkable progress of dental education; they will continue to be the chief force in the future advances of the profession. In support of this proposition, I invite you to consider the following facts.

Except for anatomy, the medical sciences are of comparatively recent origin. Neither here, nor in any other country, did the practice of medicine show rapid improvement until the younger medical sciences began to be formulated, notably the sciences of bacteriology, physiology, and biochemistry. The revolutionary changes in American medical education began with the introduction of the newer medical sciences into the curriculum. As these sciences have come to take a larger place in medical education, there has been a new orientation of medical teaching. The schools have been made over, and a new and different breed of practitioners has been produced. The present requirements of premedical education have been based on the exacting demands of the medical sciences for an informational background and mental maturity. Medical research, which has accomplished such wonders during the last quarter century in the cure and prevention of disease, is preponderantly research in one or another of the medical sciences.

Dental education has trailed about fifteen years behind medical education in the recognition of the medical sciences, which are the base of dentistry as they are the base of medicine. But each successive improvement in dental education within the last generation is clearly attributable to an enlargement of the rôle of these sciences in the dental curriculum or to an improvement in the presentation of them to dental students. The gradually increasing requirements of predental education have been justifiable on the basis of the increasing prominence of the medical sciences in the curriculum. The slow but steady growth of respect and cooperation between the medical and dental professions is largely a product of the growing identity of the fundamental preparation for these two callings.

Having made these somewhat emphatic statements—all of which I am certain can be substantiated—I now hazard the guess that the most puzzling problems before dental educators relate to the medical sciences. Dental schools have had to contend with two serious handicaps in their efforts to expand fundamental scientific training. The students have furnished one handicap; the teachers another. The few partial studies that have been made show that dental students as a group are less interested in courses in medical sciences than are the medical students in the same universities. They get lower grades in these subjects than do the medical students. They are less likely to be convinced of the ultimate professional usefulness of these studies. Their attitude is fortified by the fact that there is slight correlation between students' records in fundamental science courses and their achievements in clinical dentistry, either as students or subsequently as practitioners. This condition surely suggests that the schools have not yet found the way to make instruction in the fundamental sciences an effective element in the curriculum.

Although I cannot prove it, I am per-

suaded that the handicap furnished by the teachers of the medical sciences is chiefly responsible for the general failure of dental schools to achieve satisfactory results in this portion of the dental course. All but a few dental schools are divisions of universities. In most of them, the courses in the medical sciences are given by members of the medical faculties of the same universities. I think it is fair to say that very few medical teachers address themselves conscientiously and with interest to the instruction of students of dentistry. Few of them take pains to see that the illustrative material and the problems selected for use in instruction have any application to the future clinical activities of dental students. Too often, the dental classes are looked upon as a troublesome burden, to be shuffled off as quickly and as easily as possible. Too often, the medical departments assign their least experienced and least skilful members to the instruction of dental students.

There is no easy remedy for this situation. It cannot be cured by administrative fiat. It has been suggested that the best results may be expected if the medical sciences are taught in dental schools by dentists who have a thorough scholarly grounding in these branches, as was formerly the common practice. Personally, I do not think that it would be desirable or even possible to breed a special race of preclinical teachers for dental students. To split the taproot which sustains both medicine and dentistry would not promote the vigor of either profession. That is not the point at which the separation of the professions may be profitably effected. On the contrary, that is the point at which their unity should be emphasized—for the advantage of both. We are thrown back, I believe, on a much harder solution of the existing difficulties. There is no substitute for unremitting effort by dental faculties and university administrators to bring the preclinical departments of medical schools to a full realization of their responsibility for the medical aspects of dental education—painful though this effort may be; slow as progress toward the desired end may seem. Of the importance of the objective, there can be no doubt. What dental schools need now most of all is the intelligent, imaginative and enthusiastic presentation of this foundation material, and the proper correlation of it with the clinical aspects of dentistry.

And the reason why this is the most urgent need is that only through such service can we hope for the development of effective research into the whole range of dental problems which are waiting to be solved. I have already noted that the modern flowering of medical research followed close upon the reform of medical education. The relationship was one of cause and effect. We may expect a similar consequence in the field of dentistry when we have laid the foundation for it.

Biologic research, using that term in its broadest sense, has been mostly conspicuous by its absence in the dental schools of the country. For this, both the schools and the profession have been frequently reproached. The condemnation seems to me to be short-sighted and unjust. As I see it, dentistry is really two professions. A large part of it, indeed the most conspicuous part of it to patients and to many practitioners, is engineering. It is small scale engineering, dealing with problems of physics and inorganic chemistry, stresses and strains and strength of materials, the creation of new materials to serve particular purposes, and design. In ingenuity, in inventiveness, as well as in practical skill, American dentists have had no peers. Extensive and extraordinarily valuable research has been going forward in this phase of the profession for a century or more. If the profession did not get on at an equal rate with biologic research, it was because no one saw until quite recently the crucial importance of biologic prob-

lems. But now dentistry is awake to them, and must find the means to attack them.

I do not minimize the difficulty of providing in dental schools facilities and personnel comparable to those which medical schools possess for conducting research in the fundamental sciences. Vast sums of money have gone to the building up of establishments for research in medical science. The money was not easy to raise, but it was raised at a time when that process was easier than it is now, or is likely to be in the near future. Nevertheless, I do not think these facts should discourage dental educators or the profession in general. Such great sums would not be required as have been obtained for the support of medical research. The field is much narrower, and, in any event, the beginnings would have to be small because not many trained investigators are available. If the profession is convinced of the importance of biologic research as an activity of every first class dental school, it can find a way to see that the start is made. Medical research was not financed all at once. It gained larger and larger support because both the medical profession and the general public came progressively to realize the value of the results.

If any one thinks that this is an inappropriate moment to consider further improvements, perhaps expensive improvements, of dental education, I cannot agree with him. Some professions will virtually have to hibernate until the war is over. If they can hold their lines, they will be lucky. If standards of training are not undermined, that will be more than the most optimistic dare hope. But such is not the case with the dental profession.

Have you ever noted the historical fact that the professions devoted to the protection of health have made the most rapid progress during or immediately after each major war? Both medicine and dentistry received an immense stimulus from the Revolution. Another was the result of the war between the states. Nursing practically came into being through the impulse given it by the same conflict. And think of what World War I did for both medicine and dentistry! In the horrid and destructive mess of war which now confronts us, this fact furnishes at least one element of relief. The times that try men's souls are the times when the healing professions reap their richest harvest of public gratitude and appreciation; the times when these professions can most readily move forward to higher standards of performance, if their leaders do not fail to hear that the favorable hour has struck.

COMMITTEE ON LEGISLATION

DENTAL JURISPRUDENCE—AVOIDANCE OF UNNECESSARY MALPRACTICE ACTIONS BY THE ORAL SURGEON

By DUDLEY C. HUGHES, D.D.S., New York, N. Y.

THE title of this paper, "Dental Jurisprudence—The Avoidance of Malpractice Suits by the Oral Surgeon" may seem a dry subject, and to those who have never been involved in a malpractice action, it may even seem irrelevant. However, if one continues the practice of oral surgery and exodontia long enough, he will become involved in malpractice litigation.

I hope that the advice in this paper will help you to avoid unnecessary legal complications, as well as forestall unpleasant misunderstandings with patients, dissensions that might not develop into court procedures, but might mean the loss of the patient to your practice.

The malpractice suit against physicians and dentists is not a new evil. Oliver Wendell Holmes mentioned such suits more than fifty years ago. However, there is no doubt that there has been a great increase in frequency of these actions since those days.

In the preparation of this paper, I wrote to the three outstanding insurance companies who handle the majority of malpractice policies. I wanted some statistics as to the hazard of exodontia as compared to general dental practice and their views in general on the malpractice evil.

The first company wrote:

It is well to bear in mind that the experience of insurance companies varies with the different states and, in some instances, even in separate localities within states; also the experience of one company in a state may be quite the opposite of the experience of another company in the same state. The experiences of insurance companies will likewise vary according to the care used in the selection of risks and other factors. To show how these variations sometimes reach the extreme, we might point out that, in general, the dental hazard is less than the medical hazard, but in one state in which we operate, the converse is true.

Many articles have been written regarding malpractice litigation, and statistics have been quoted freely which we ourselves would be inclined to question. Recently one such article stated that of 75,000 dentists practicing in the United States, more than 60 per cent carry liability protection and more than 50 per cent of all those insured are insured by three companies. Since our company is the only company specializing in this field exclusively, and since multiple-line companies do not segregate professional liability insurance in their general casualty field, we do not know how this writer reached these figures.

The same writer stated that 90 per cent of all claims against dentists grow out of extractions. There might have been some occasion for his making such a statement, such as the record of the company which he represented, but we cannot understand his speaking for the experience of the profession as a whole when he cannot know the experience of other companies such as our own or the experience of the 40 per cent of the profession which he, himself, said were uninsured. Our own record shows a much smaller percentage than this.

Read at the Twenty-Third Annual Meeting of the American Society of Oral Surgeons and Exodontists, Houston, Texas, October 25, 1941.

Company Number 2 replied:

Statistics prepared a few years ago on a sufficiently large number of all kinds of malpractice claims under our dentists' liability policies and over a sufficiently long period of time to be indicative showed that about 70 per cent of all claims against dentists grow out of extractions.

I may add that these figures are on a per case basis, not upon the value of the cases, but we know that the size of the damages asked and the amount of the damages or compromises paid by us in cases that we do not successfully defend, as a whole, are much larger when extractions and complications are involved.

Consequently, we can say in all honesty that the hazard of the oral surgeon and exodontist is an outstanding one in the practice of dentistry.

I believe some insurers charge a higher rate for oral surgeons than for other dentists and we ourselves charge 100 per cent additional for exodontists' policies.

There has been little movement in claim frequency in the past ten years.

I can, however, say with certainty that both the frequency and the amount of dental claims of all kinds have been higher in the past decade than in the one preceding it, in spite of the gradual advance of the profession in its practice.

Company Number 3 replied:

It has been our experience that malpractice actions do not increase in number in periods of depression, when a large part of the public are feeling a financial stringency and need money badly. Indeed, it seems to us that as general prosperity of the country increases, the number of malpractice actions increases. Perhaps this is because more people have dental work done in times of prosperity and perhaps the percentage of treatments which result in malpractice action is substantially constant. We do not believe this to be true, but, on the contrary, suggest that as a dentist in times of prosperity has a larger number of patients, he does not feel so greatly the need of pleasing each patient that he treats.

At the end of a ten-year period, the results showed that 70.3 per cent of all cases then open were based on extractions; 45 per cent of the claims resulting from extractions have been closed without payment, and 30 per cent of the claims resulting from extractions have been closed by payment.

In analyzing these figures, we arrive at these conclusions: seventy per cent of all malpractice actions against dentists grow out of extractions and recoveries against the dentists are obtained in 66⅔ per cent of these actions. We do not know how many cases these figures represent, but I was surprised to learn that in two-thirds of the cases against the dentist, payments were made. Of course, these are the figures of only one company, but at least they show the general trend in malpractice litigation. Unfortunately, it is impossible to allocate between the exodontist and the general practitioner the 70 per cent of claims resulting from extractions. I do believe that the majority of cases arise in the practice of the general dentist, who cannot be expected to have the experience or skill of the specialist and therefore gets into more trouble. However, since the specialist does more elaborate and more difficult operations, wherein the chances of complications are greater, I have no doubt that he is responsible for a certain percentage of these claims.

When one is sued for malpractice, one of two courses is open: to settle or to fight the case to a finish in court. Some men believe in settling every case, if possible, to prevent adverse publicity. Others believe that settlements encourage the public to sue and believe in taking every case to court.

My stand is between the two extremes. I believe in following the judgment of the insurance company. After all, they pay the damages, if any, and if they believe they can make a better deal by a settlement, I would agree. Likewise, if they would rather go to court, I would not hesitate, for reasons of adverse publicity, to go with them.

One should be very careful in the selection of a malpractice insurance policy, especially if one employs an as-

sistant or associate. It is safer for both the owner of the practice and his associate or associates to have individual policies.

If injury results from negligence of an exodontist's associate, the injured person sues both the owner of the practice and the associate. If a judgment is rendered against the owner, or insured, he is naturally covered. However, a separate judgment can be rendered against the associate, and the insured company can refuse to pay the amount of damages.

I know of a case in which this actually happened. Both the insured and his associate were sued for malpractice, the associate having operated on the claimant. The insurance company defended the insured, or owner of the practice, but refused to defend the associate. The associate was even obliged to hire a lawyer to defend him. Fortunately for the associate, a verdict was rendered in favor of both defendants.

This particular policy had been in force for years with one of the largest multiple-line companies in the country. In previous cases, the insurance company had defended both the insured and his associate, but for some reason in the case cited above, they decided that they were not obligated to defend the associate. I might say that the premiums paid for this policy were much larger than the premiums usually paid for two separate policies.

No doubt, there are many associates who are practicing dentistry under the delusion that they are covered by one office malpractice policy. My advice to them is to take out an individual policy.

In my opinion, there are four principal reasons for malpractice suits:

1. Ignorance on the part of the public as to the obligation of the dentist to the patient. The average layman believes that a surgeon should always be able to guarantee a perfect result. If the patient has postoperative complications, excessive pain, infection, paresthesia of the lip, etc., he feels that the surgeon can be held responsible for negligence. This view is not upheld by the courts.

It is fortunate for the physician that his implied employment by his patient does not guarantee a good result. "It would not do," the courts of Indiana have declared, "to hold that every physician who administers a dose of medicine and every surgeon who performs an operation does so at his peril if the result happens to be not good; that a jury of laymen might mulct him in damages if they, as laymen, should think that he had been negligent in the matter complained of, although his conduct has been in harmony with well-recognized standard methods, used by physicians generally in such cases."

2. The advice of the unscrupulous lawyer to his client to bring action, knowing there is no cause, but hoping through fear of adverse publicity to frighten the dentist into making a settlement.

3. The general tendency of the public toward litigation as time goes on, and the increasing liberality of the courts toward the patients, both in decisions against the defendants and in the amount of damages awarded. The public assume that all dentists carry malpractice insurance and, if they think there has been negligence on the part of the dentist, they believe the insurance company will settle as simply and quickly as in automobile accidents. They do not realize that the dentist has a reputation to protect.

4. Unfavorable criticism expressed to the patient regarding the results of an operation or treatment by a second practitioner or dentist. In my opinion, this criticism, ofttimes unjust, of another's work is responsible for most malpractice actions.

What type of professional man would unjustly criticize his colleague? You might think him to be a less able man or an unsuccessful man who used that means to impress a patient and build up

a practice. Unfortunately, this is not always true. I know of several able oral surgeons, well-thought of by the public, successful financially in their practices, and yet who seem to take delight in criticizing unjustly their colleagues' ability or methods. Men of this type show a definite lack of character and professional ethics. A man of fine mental perception will not be puffed up or unduly impressed with his own importance or attainments. He will not unduly struggle to impress nor will he indulge in needless criticism.

I suppose it is a human trait to get some satisfaction out of the misfortunes of another, but it is a weakness which we as professional men should learn to control. At least, we should be ashamed to express it openly.

If a patient seeks our advice or treatment because of an error or a bad result at the hands of one of our colleagues, we should institute proper treatment and not criticize verbally or infer by a knowing expression that the operation or treatment was a failure. Even though a glaring mistake was made and the patient suffered unnecessary injury, criticism will not help in the least to repair the damage.

If my assumption is correct, i.e., that a large majority of malpractice actions are started because of some careless remark or needless criticism by another practitioner, it is within our power by ethical conduct to prevent a large majority of such suits. The fact that we arrive at, or act upon, a conclusion different from that of our predecessor affords in and of itself no just basis for condemning his judgment or his action.

I should like to discuss certain legal principles which govern the practice of our profession and with which we should be familiar.

What do the courts say about our obligations to the patient?

In a manner unsurpassed for clarity and brevity, the New York Court of Appeals, thirty-two years ago, in its luminous opinion in the Pike case, laid down the law on this subject. This famous decision has been quoted with approval throughout the United States.

A physician and surgeon, by taking charge of a case, impliedly represents that he possesses, and the law places upon him the duty of possessing, the reasonable degree of learning and skill that is ordinarily possessed by physicians and surgeons in the locality where he practices, and which is ordinarily regarded by those conversant with the employment as necessary to qualify him to engage in the business of practicing medicine and surgery. Upon consenting to treat a patient, it becomes his duty to use reasonable care and diligence in the exercise of his skill and the application of his learning to accomplish the purpose for which he was employed. He is under the further obligation to use his best judgment in exercising his skill and applying his knowledge.

As to the ordinary practitioner, i.e., one not claiming to be a specialist, the court enunciated this fair principle:

> The rule in relation to learning and skill does not require the surgeon to possess that extraordinary learning and skill which belong only to a few men of rare endowments, but such as is possessed by the average member of the medical profession in good standing. . . . Every physician is bound to keep abreast of the times and may not depart from approved methods in general use. . . . The rule of reasonable care and diligence does not require the exercise of the highest possible degree of care. . . . His implied engagement with his patient does not guarantee a good result, but promises by implication to use the skill and learning of the average physician, to exercise reasonable care and to exert his best judgment in the effort to bring about a good result.

The law for specialists is a little different. A specialist is one "who applies himself to the study and practice of some particular branch of his profession." A physician or surgeon who holds himself out as being specially versed in some phase of medicine is required to possess special knowledge and skill, not merely

such knowledge and skill as the average physician has, but such as is possessed by the average specialist.

If a specialist "possessed no greater skill in the line of his specialty than the average physician," the Indiana courts have said, "there would be no reason for his employment; possessing such additional skill, it becomes his duty to give his patient the benefit of it."

The obligations of the doctor to the patient laid down by the courts are fair. The former is not required to be a genius or superman in medicine or surgery. He is merely required to possess and use the skill of the average physician or the average specialist.

We have definite obligations to the patient, but the patient also has definite obligations to the doctor. It is not a one-sided arrangement.

Judge Pryor, of New York, in a famous case, charged the jury thus:

> All the obligation is not upon the physician, but the patient also has his duties to discharge. In particular, the patient must obey the orders and follow the directions of his physician and, if he disobeys such orders or neglects such directions, he cannot hold the physician for the consequences of such disobedience or neglect.

Not infrequently, a patient will refuse to have an x-ray picture made, even when we believe it will be an important aid in diagnosis. We can protect ourselves by securing from the patient a signed statement that he refused to have an x-ray picture taken, although we had advised it. Without this signed statement, the patient can deny in court that such instructions were ever given.

Sometimes, a patient fails to return for treatment, even though he has been instructed to do so. In such cases, if the consequences are injurious, the patient cannot hold his doctor liable: he is guilty of contributory negligence. In fractured jaw cases, patients have been known to refuse to keep splints or wires on even when instructed to do so by their dentist. If the wires are removed by the patient or another dentist and complications result, the original dentist cannot be held responsible.

Patients have been known to leave the hospital against their surgeon's advice. They are guilty of contributory negligence if complications arise because of such acts.

If, however, the injury is first caused by the physician's negligence, the subsequent negligence of the patient cannot be used in defense of the negligence of the physician. "The most which could be claimed on account of any subsequent negligence," declared the New York Court of Appeals, "would be that it should mitigate the amount of the plaintiff's damages."

These obligations of the patient to the doctor certainly seem obvious, and any layman should know of their existence by his intuition. Yet many malpractice actions have been begun wherein the injury complained of was attributable solely to the patient's own neglect or refusal to obey the directions of his doctor.

ASSAULT OPERATIONS WITHOUT CONSENT

"Every human being," said Judge Cardozo of the New York Court of Appeals, in the celebrated New York Hospital case, "has a right to determine what shall be done with his own body; and a surgeon who performs an operation without his patient's consent commits an assault for which he is liable for damages. . . . This is true, except in cases of emergency when the patient is unconscious, and it is necessary to operate before consent can be obtained, to save the patient's life."

In our field of surgery, we rarely come in contact with emergency operations when the patient is unconscious, with the exception of a possible tracheotomy. When we operate upon a patient under a general anesthetic, we should have a clear understanding with the patient beforehand as to what is to be done. If we

decided to remove certain teeth and during the operation some other tooth should be loosened or injured beyond repair, it is much wiser to allow the patient to regain consciousness and then get his consent to its removal. Otherwise, the patient could sue the dentist for operating without consent.

A minor child should not be operated on without the consent of its parents or of some one who, under the circumstances, would be legally authorized to give the requisite consent. An older brother, sister or governess is usually not legally authorized to give such consent.

At times, we all probably remove teeth for a minor child without the actual consent of the parent, but, if some unexpected complication results, we can be held responsible.

ABANDONMENT

When a physician engages to attend a patient without limitation of time, he cannot cease his visits, except, first, with the consent of the patient and, secondly, upon giving the patient timely notice, so that he may employ another doctor or, thirdly, where the condition of the patient is such as no longer to require medical treatment, and of that condition the physician must be the judge, at his peril.

Thus, a patient can dismiss his physician, but a physician cannot discharge a case and relieve himself of the responsibility without first giving his patient sufficient notice to enable him to procure other medical attendance. If we start treatment of long-drawn-out cases, such as a osteomyelitis or fracture case, we cannot discharge the patient before he is cured even though he does not pay the bill or may be offensive in other ways. If vacation time should come around during such treatment, we should arrange for some one else to carry on during our absence.

STATUTES OF LIMITATIONS

Statutes of limitations are "statutes of repose, the object of which is to suppress fraudulent and stale claims from springing up at great instances of times and surprising parties or their representatives when all the proper records and evidence are lost or the facts have become obscured from the lapse of time or the defective memory or death or removal of witnesses."

Two years is the legal limitation for the commencement of a malpractice action in about half of the states, including New York. There is a one-year limitation period in California, Connecticut and Ohio and several other states. In Maryland and about six other states, the limitation is three years. Several states have six-year limitation periods.

When does the period of limitation begin? This becomes especially important in that class of cases wherein foreign bodies have been permitted to remain in the body. In such cases, does the period start at the time the malpractice was committed or does it begin when it was discovered by the patient?

One of the most important decisions on this subject arose in New York, where a dentist, in extracting a tooth, permitted it to drop down the patient's trachea and it lodged in her lung. It was more than three years after this that the patient discovered the facts. In New York, the statute covers two years. The dentist moved to dismiss the complaint upon the ground that it set forth a course of action based on an act of malpractice, which had occurred more than two years before the commencement of the action. The plaintiff contended that the dentist had known of his negligent act when it occurred and had concealed it from her in the meantime, and that she had not begun her suit within the two-year period because she did not know facts until more than two years had elapsed. Nevertheless, the court held that the action was barred, declaring:

There is nothing alleged from which we may infer that the defendant knew, or ought to have known that the tooth had lodged

in the lung. . . . There is nothing alleged from which we may infer any intentional fraudulent misrepresentation of fact as to the presence of the tooth in the lung resulting from letting it fall down her throat. At the most, there was a breach of professional duty in the operation alleged to have been negligently performed and in the concealment of his negligent act. That was malpractice and the statute had run against such a course of action.

Some patients may believe that the most effective reply to a doctor's suit for the recovery of the fee for his professional services is a counter claim or an independent action charging the doctor with malpractice. If a patient refuses to pay a bill because of dissatisfaction with the services performed, it is better to wait before bringing suit for collection until the statute of limitations has run out. This will prevent a counter-suit claiming malpractice. In New York State, a doctor's action for professional services rendered can be commenced any time within six years after the rendition of the last service. In most other states, the limitation period for malpractice actions is shorter than for contract actions.

Now that we understand some of the legal aspects of our association with the patient, what can we do to avoid unnecessary misunderstandings and malpractice suits? I shall make some practical suggestions which I hope will be of help to the exodontist.

These suggestions may seem trite to men of your experience, but some of them may be novel. A large percentage of these suits have no real basis for an action: they arise from some misunderstanding between the patient and the dentist and, usually, with the type of patient known as a "trouble-maker." We can all recognize this type. The patients come into the office with a chip on their shoulder and maliciousness in their hearts. They are uncooperative and often question our judgment or advice. It has been my experience that the type of patient who is looking for trouble often finds it. If the operation does not go along smoothly or there are some post-operative complications, the trouble-maker becomes almost belligerent. Unless the exodontist has the qualities of a saint, he may exchange a few sharp words with the patient and the result will be a suit out of spite and downright meanness. With this class of patients, we must always be on guard; and must employ extreme tact.

Lloyd Stryker, for many years general counsel for the Medical Society of the State of New York, in his book "Courts and Doctors," defines tact very clearly. I should like to quote a paragraph from his book.

I never kept accurate statistics on the subject, but I always felt that not a few of the controversies between doctors and their patients coming to my notice might have been prevented by a greater display of tact by the physician. Tact has been defined as a fine sense of how to avoid giving offense. It has likewise been described as fineness of discernment as to action or conduct. Others have spoken of it as an intuitive sense of what is true, right or proper. A fine sense of anything presupposes a sense well developed, an alert and a trained mind. A sense of how to avoid giving offense could only come from a consideration of the rights, the sensibilities, even the prejudices of others. An intuitive sense of what is true, and proper can spring only from a generous character and sound ethical development.

Tact is a priceless asset for any professional man; it is indispensable to the physician. . . . How he will fare with his patients (granting, of course, reasonable competency) will largely depend upon his sense of tact or his lack of it.

A well-known New York lawyer who does a great deal of malpractice work wrote to me concerning this evil. His observations are interesting:

My own experience is that a bad result, such as an osteomyelitis or even a pronounced cellulitis, is not necessary in order to have a malpractice action, and certainly a malpractice action does not arise in every

case where there is such a result, or even when there is a fractured jaw bone or a broken needle. One of the most difficult and hard-fought cases I ever tried grew out of a most careful diagnosis by an oral surgeon, resulting in his conclusion, which was demonstrated by a subsequent history to be correct, that the tooth to be extracted to remedy the lady's difficulty was not the tooth designated by the referring dentist as to be extracted, but an adjoining tooth and his extraction of the latter, with a perfectly normal postoperative history.

I think I am nearly convinced that the cause of most malpractice actions is a failure by the dentist to procure in the patient the psychological reaction which may be described as an appreciation by the patient of the efforts by the dentists to relieve the patient of his malady.

I do not agree that this lack of psychologic reaction between the patient and the dentist is the cause of most suits, but I do believe that it is an important factor in many suits. This favorable psychologic reaction is just another way of saying the patient has confidence in the oral surgeon. Some men have the faculty of instilling confidence in a patient more readily than others.

Let us not try to impress the patient unduly with our past attainments and a history of the wonderful operations we have performed. Oliver Wendell Holmes once said: "The less pretension you make, the better they [your patients] will like you in the long run."

Let us be amiable and sympathetic; above all, not vacillate in our opinions and manner. If we can give the patient that feeling of assurance that we know what we are doing, we will have his confidence in spite of any possible unpleasant postoperative complications.

I believe that the following practical suggestions will help us to avoid trouble:

1. If a patient of one of our colleagues becomes dissatisfied with his postoperative progress and comes to us for treatment, let us reassure the patient that he is progressing normally under the circumstances and do all in our power to influence him to return to his dentist. If the patient is progressing normally under the previous dentist's care, I think it is wise and ethical to refuse to take over.

2. Careful and detailed records should be kept, and certainly until the statute of limitations has run out. We keep our records for at least six years. This will fully cover the period during which one can be sued for breach of contract. These records should contain all important details of every operation, the number of gauze dressings, sutures, medicaments used, type of anesthesia, any untoward reaction of the patient to the anesthesia, etc.

3. Let us not allow the dentist or the patient to dictate to us the type of anesthesia to be used. In the majority of simple operations, we please the patient as far as the choice of anesthesia is concerned. However, in difficult, long-drawn-out operations, we prefer to use procaine in the office rather than nitrous oxide, and we do not allow the dentist or the patient to influence our decision. Some exodontists perform more difficult operations than others under nitrous oxide, but that decision must rest with the operator himself. If we are influenced against our better judgment by the patient or dentist in the choice of anesthesia, and the result is poor, he will be the first one to say that we should have used our own judgment originally.

Nitrous oxide anesthesia should not be used if procaine is possible, when the mouth is full of large, elaborate and fragile prostheses or extremely loose teeth. The mouth gag or prop may do some costly damage.

4. If postoperative complications are anticipated, such as paresthesia or an opening into the maxillary sinus, this should be explained to the patient beforehand. Then, if these complications should develop, the patient will not lack confidence in our ability.

5. Let us be conservative in our prognosis. Unjustifiable promises often lead to misunderstandings, disappointment and lack of confidence, and sometimes even to malpractice actions. The average osteomyelitis case usually runs a course of two and a half to three months before sequestra can be removed. We must explain this to the patient at the start, not procrastinating and telling them that they will be all right in a few weeks. The same principles hold true for fractures, postoperative pain, etc.

6. After an operation, the tooth should not be given to the patient with a portion of the buccal plate attached to it. The bone should be ripped off with a rongeur before the tooth is shown to the patient. A small piece of thin buccal plate looks very serious to some patients.

Last spring, I testified as an expert in a case wherein a general dentist had removed an upper second molar. It was a case in which the first and third molars were absent and the maxillary sinus dipped down into the tuberosity distally from the second molar. The roots of the second molar were long and curved and the sinus was very large, with a resultingly thin buccal wall. When the dentist removed the tooth, the floor of the sinus, the tuberosity, a large portion of the buccal wall of the sinus and even a part of the lingual plate came away, firmly attached to the tooth.

The dentist gave the patient the specimen and sent her to an oral surgeon for closure of the sinus. The patient afterwards sued the dentist on the strength of this specimen and a few critical remarks that the oral surgeon had made about the dentist's technic. Of course, the specimen was shown to the jury, and to them it probably looked like half the maxilla. They rendered a judgment against the dentist of $1,100.

If the dentist had removed the bone from the tooth before giving the tooth to the patient, probably a suit would not have been instituted, and the jury certainly would not have rendered a verdict against the dentist. I have more than a dozen of such specimens in my collection. We should always be cautious in the removal of such upper second molars.

The importance of x-rays in the diagnosis of any possible bone injury, and before and after reduction of fractures, cannot be overemphasized. It is becoming increasingly difficult to defend any such cases without full x-ray records.

We all agree that x-ray pictures, both preoperative and postoperative, are of utmost importance in our specialty. But I believe that their importance can be and is exaggerated, especially in court. I have heard general dentists, posing as experts in court, for a fee, testify that they never extract a tooth without both preoperative and postoperative x-ray films. This statement may bear considerable weight with the jury, but we all know that such practice is not common, even among specialists in our field. There are many instances in our daily routine, in the removal of teeth, where postoperative x-ray films are superfluous.

I should like to go on record as saying, and this society should support the statement, that it is not always necessary nor is it common practice to take x-ray pictures before and after every extraction. The question of postoperative x-ray pictures should be left to the judgment of the operator. Frequently, careful postoperative inspection of a tooth socket will reveal more than a roentgenogram will. If a tooth comes out in sections or if a filling crushes in its removal, a postoperative x-ray picture is indicated. In the treatment of fractures, osteomyelitis and other serious bone involvements, check x-ray pictures should be taken during the course of treatment. All x-ray films should be carefully kept with the records of the case.

8. In a few instances, it is better judgment to leave fractured root apices in place rather than attempt their removal. The damage done in their removal would

be greater than the hazard of leaving the apex in place. For instance, in attempting to dislodge or pick out a small apex of a mandibular third molar, we may nick the mandibular artery. Immediately, there is free hemorrhage, which makes it impossible to see the field of operation. Pressure may stop the flow of blood temporarily, but further work will start it again. In picking around blindly, we may injure the mandibular nerve, with a resulting paresthesia, which will prove more distressing to the patient than leaving the apex in place.

A small fractured apex of a high unerupted maxillary third molar is best left in place. It is impossible at times to even see such an apex. Blind picking about will probably open the maxillary sinus, with possible complications. If, in cases of this type, we consider it our best judgment to leave an apex in place, we should always inform the patient regarding the situation and have him return in a year for an x-ray check-up of this area. If the case is managed in this manner, we cannot be held responsible for negligence.

9. Carefully adjusted throat-packs should be used in every case operated upon under general anesthesia, and in cases performed with local anesthesia if we expect the crown of a filled tooth to shatter in its removal.

If we are performing multiple extractions of mandibular teeth having large amalgam fillings or other restorations, each preceding socket should be packed with cotton to prevent particles of amalgam from lodging in the open sockets. Sometimes, these small particles are most difficult to remove.

If teeth shatter in the process of extraction and a patient develops a nonexpectorant cough, a sort of spasmodic expelling or clearing of the throat, it would be best to have a chest x-ray picture taken at once. There might be a foreign body in the trachea or one of the bronchi.

10. If a hypodermic needle should break during an injection, it should be removed at once. If we should fail to remove it, we should inform the patient regarding the situation. The courts will not hold us liable because the needle broke, but if we try to hide the fact from the patient, we may be found guilty of negligence.

11. If a patient, because of some real or fancied bad result, shows an inclination to sue, we should not admit negligence and, above all not put anything in writing, to either the patient or his lawyer, but should let our insurance company take care of the situation.

12. One misfortune that the exodontist should continually be on guard against is removal of the wrong tooth. This happens more frequently than one imagines. It is not at all uncommon for the dentist to refer the patient to the specialist with the wrong tooth marked on the chart. Not that the dentist has made a wrong diagnosis, but through lack of concentration on his part or that of one of his assistants, a tooth is marked for extraction other than the one that they intended to mark. Then, too, at times, the dentist does make a wrong diagnosis. In either case, we should go over the diagnosis carefully and explain to the patient just which tooth we are going to remove.

At times, the exodontist, by mistake, will take out the wrong tooth even when the one to be extracted is clearly marked on the chart. This happens only because of lack of concentration on the part of the exodontist. The operator's attention may be diverted by conversation with the patient, or his mind at the time of the operation may be on his golf game, his taxes or almost any subject other than the one in hand. I know of many instances where this mistake has occurred. It happened to me last spring, and it was embarrassing. This was my first error of this type, but I have had some "near-misses," as they say in the R.A.F.

The best insurance against this type of error is eternal vigilance and concentration. The assistant can also be of help in checking off the correct teeth. One of the best double-checks is to point out to the patient in a hand mirror the tooth or teeth to be removed. Pointing at or touching the tooth, without the use of a mirror by the patient, is not sufficient.

CONCLUSION

The best way to avoid a law suit is not to deserve one. If we give our best efforts at all times and are careful in our diagnosis and operative procedure, we are apt to avoid trouble. I say we are apt to avoid trouble; but we cannot avoid trouble with certain patients no matter how conscientious we are. If we have early indications that the patient is a "trouble-maker," we do well to terminate our relation with him at the first available opportunity.

Let us be tactful and just to our fellow-practitioner, avoiding needless criticism. If only this one thought remains with us, many misunderstandings and malpractice actions will never materialize.

654 Madison Avenue.

RECENT COURT DECISIONS

MALPRACTICE: SKILL, CARE AND JUDGMENT IN EXTRACTION

THE plaintiff sued the defendant dentists, doing business under the trade name Painless Parker Dentists, for malpractice. In August 1938, the plaintiff visited the defendant's office and had her teeth examined and x-rayed. Following this examination, the defendants recommended the extraction of five upper teeth, the only ones remaining in her mouth, and the substitution of full dentures. As soon as the two upper teeth on the right side were extracted, the plaintiff complained of pain and a suction of air into her nose. This pain continued for several days and the plaintiff returned several times for treatment and was finally referred to a specialist. The specialist treated her for several weeks, but the pain continued unabated until the patient went to an ear, nose and throat specialist, who opened the antrum and afforded her immediate relief. The specialist continued to treat the plaintiff twice a week for almost a year. The plaintiff based her suit on two charges: (1) that the defendants falsely represented that the teeth needed to be extracted and (2) that the defendant negligently and carelessly used infected, unsterilized instruments, applied force, fractured and broke through the bony process surrounding the teeth and separating them from the antrum and permitted the antrum to become infected. After all of the evidence had been presented, the defendants moved "for dismissal of the action on the ground that there is no evidence whatever to go to the jury." The court granted the motion and entered judgment for the defendant. The plaintiff then appealed to the Supreme Court of Washington.

In its opinion, the Supreme Court first discussed the plaintiff's charge that the defendants falsely represented that all of her teeth needed to be extracted and concluded by saying that the plaintiff clearly failed to prove this charge. The plaintiff's own expert, said the court, testified that it was out of the question to build bridgework on her remaining upper teeth, and whether such teeth should have been extracted was a question of judgment or opinion, which depended not only on the x-ray pictures available to him, but also upon the clinical examination made by the attend-

ing dentist at the time of the latter's diagnosis. There was, therefore, no substantial evidence of the falsity of the representations alleged in the first cause of action.

With regard to the plaintiff's charge that the teeth were negligently extracted and that the defendants failed to give proper treatment following the extraction, the court believed there was more substantial evidence in favor of the plaintiff's charges. Clearly, said the court, according to the testimony of plaintiff's expert, the manner in which the teeth were extracted, as plaintiff described it, by jerking them outward and upward, instead of pulling them downward, as one would pull a nail, in the line of least resistance, was not proper or in accordance with ordinary dental practice in Seattle. From the manner in which the extraction affected the patient, the expert concluded that it had resulted in breaking an opening into the antrum by fracturing the bony process about the tooth roots. It may be reasonably inferred from his testimony that the existence of an opening increased the likelihood and the danger of infection entering the antrum from the mouth.

To supplement this expert testimony, said the court, we have the circumstances detailed by the plaintiff, that she had had no antrum trouble before the extraction; that the extraction made her feel as though her jaw had been broken and immediately caused her severe pain in the right side of the face and head, which was not relieved until the antrum was opened and drained, and that, following the extraction, there was also an immediate, noticeable suction of air from the mouth through the tooth socket and antrum into the nose. Finally, there is the testimony of the eye, ear, nose and throat specialist that, when the patient came to him about twenty-five days after the extraction, she was suffering from an acute or recent infection of the antrum, and he removed spicules or splinters of bone from one of the empty upper tooth sockets, which, he conceded, might have come from the floor of the antrum. We think, concluded the court, that the testimony of the plaintiff's expert witness and the circumstantial evidence considered together were sufficient to make a jury case. The judgment of the superior court with regard to the second cause of action is reversed, with instructions to grant the plaintiff's motion for a new trial.—Hill *v.* Parker. 122 P. 2nd 476 (Wash. 1942).

COMMITTEE ON ECONOMICS

A DENTAL PROGRAM FOR INDUSTRY

By R. M. WALLS,* D.D.S., Bethlehem, Pa.

IN the past, the American Dental Association has, for the most part, confined its activity with regard to industrial dentistry to conducting surveys designed to determine the number of such activities that were in existence, the size of the establishment and the extent of the service being offered, and to secure certain other information pertinent to the operation of the service.

About ten years ago, in making a study of the field, which included a consideration of the correspondence in the files of the Committee on Economics of the American Dental Association, it was deemed necessary that a set of standards for dentistry in industry be created and adopted by the American Dental Association. To this end, a set of hypothetical rules were on two occasions submitted to the officers of the American Dental Association, the members of the board of directors, the president and secretary of every state dental society, the state dental health officers and a few individual members of the dental profession who were particularly interested in the subject, including members of the United States Public Health Service.

The final draft which evolved was presented by the Committee on Economics to the House of Delegates of the American Dental Association at its Eighty-Third Annual Meeting in Houston, Texas, in October 1941, and it was accepted unanimously.

"The Essentials of an Industrial Dental Service" preceded by an explanatory statement follow:

The American Dental Association recognizes the need for better organization and service in caring for the ill and injured in industry. Since the maintenance of oral health has an important effect upon physical well-being, well organized industrial medical programs should include dental care as an integral part of their facilities. Dental defects and dental infection not only are a potential cause of sickness and loss of time, but also may be directly related to lack of concentration on industrial operation, a potential cause of accidental injuries.

The dental profession believes that the state and the local society, in collaboration with the division of dental hygiene of the state department of health, are best qualified to plan and organize a program to meet the needs of the industrial group in a particular community. Consequently, the profession holds that it is incumbent upon the industrial concern contemplating the establishment of a dental program for its employes to consult with the local dental society. Furthermore, the dental profession holds that, in order to establish the most effective program, a plan of continuing cooperation with the local dental society should be instituted.

Any further extension of an industrial dental service beyond the scope of the attached rules shall await the further exploration of these fields by the Committee on Economics of the American Dental Association and the specific authorization of the state dental society with reference to state laws and rights.

*Chairman, Committee on Economics, American Dental Association.

Read at the Annual Congress on Industrial Health, Chicago, Ill., January 12, 1942.

ESSENTIALS OF AN INDUSTRIAL DENTAL SERVICE

1. The industrial establishment shall have an organized dental service, as further specified, with a competent staff, including consultants, and with adequate facilities to insure efficient care of all employes who need palliative emergency dental treatment because of occupational injuries or who have developed oral manifestations of occupational disease.

2. The dental department shall urge all employes to obtain necessary dental treatment and shall devote a portion of its time to educating them in the value of maintaining oral health.

3. The industrial establishment shall require thorough oral examination of all persons entering employment. There shall be a system of complete and accurate records, filed in an accessible manner and available to the employe, to the medical and dental services and to governmental agencies for identification purposes. In setting up the records to be maintained, the division of dental hygiene of the state department of health should be consulted in order that a uniform system of dental records may be developed that will make possible valuable statistical analyses and comparisons.

4. Positions on the dental staff shall be restricted to dentists who are (a) in good standing with the local dental society and (b) qualified in such fields as may be included in the service.

5. The dental department or service shall have complete responsibility for the dental personnel as to the quality of service rendered.

6. Industrial dentists should be familiar with the industrial processes and watch closely for evidence of oral disease from contact with such poisons as mercury, lead, phosphorus, fluorine, acids and radioactive materials and from other chemical or physical hazards. When the presence of any oral evidence of occupational disease is noted, other units in the industrial establishment, such as the medical department or safety engineering department, should be notified immediately, to the end that cooperative study and action may be undertaken.

7. The industrial dental service shall limit itself to the service specifically mentioned above. X-ray and prophylactic services in newly established industrial dental programs and all details (not included in paragraphs one through six) of services in operation at the time of the adoption of these rules shall require merely the approval of the state dental society.

A study recently made to determine how many industries operated dental services and the type of service rendered had the following results: Questionnaires were sent to the 841 industries listed by the American College of Surgeons and 498, or 59 per cent, replied. One hundred sixteen, or 23.3 per cent, of those replying—13.8 per cent of the whole number—reported having a dental service. From fifty-three of the 116 who had a dental service, adequate employment figures were supplied which showed:

No dental service in industries having 1-100 employes.

3 with 100-500 employes having service.

4 with 500-1,000 employes having service.

10 with 1,000-2,000 employes having service.

9 with 2,000-3,000 employes having service.

7 with 3,000-4,000 employes having service.

3 with 4,000-5,000 employes having service.

11 with 5,000-10,000 employes having service.

6 with over 10,000 employes having service.

The scope of service was as follows:

Thirty-three firms reported chiefly examination and prophylaxis.

Twenty-four firms reported limited treatment service.

Fifty-six firms reported fairly broad treatment service.

From this survey, it was learned that about one company in ten employing more than 500 people and having an approved medical service maintains any dental service whatsoever.

The geographic distribution of dental services may be of interest. Forty-two per cent of the dental services are in plants in the eastern states, 37 per cent in the middle west and the remaining 21 per cent in the southern and western states and in Canada.

It was found that industries operating several plants in different areas treat each plant as an individual problem, maintaining dental service in some plants and not in others. It would be interesting to know why such an arrangement exists.

In view of the great interest that industry has shown in the health and welfare of its employes, it is rather difficult to understand why the dental health of these people has not been considered. It is not necessary to dwell on the importance of oral health before this group. It is true, and I suppose logical, that companies with interest enough in their employes to establish an approved medical service show more interest in dental service than do those who make no provision for medical service.

It is possible that the expense entailed may keep at least the small companies from establishing a dental service. In a study of dental clinics of fifty-nine companies made by the Division of Hygiene of the Pennsylvania Department of Labor and Industry, it was found that the average cost of equipping a dental clinic was $1,958.03. This figure would probably reach $2,500 today. If a medical service is already in existence, a great saving could be made by the use of the x-ray facilities, and the initial expense should not then rise above $2,000. Such figures as were obtained from the study gave yearly expenditures by the company toward dental service of from 64 cents to $9.45 per patient treated. These figures vary so widely that attempts to analyze them would be futile. A hypothetical dental budget drawn up by the Metropolitan Life Insurance Company for a company employing about 1,000 persons, and wishing to establish a dental office on its premises for examination and prophylactic work, emergency, consultation and first aid service, extractions and cement fillings, gave a figure of approximately $2,000 for initial installation and $5,400 for yearly running expenses.

The replies of the industries to the inquiry in the questionnaire concerning the method of payment for dental service showed that when examination, prophylaxis and some treatment was offered, the expense was most frequently borne entirely by the employer as his contribution toward the good will and efficiency of his working force.

Next in frequency is a cooperative arrangement wherein the company furnishes space for a dental office and perhaps also a certain amount of major equipment. A local dentist then comes in, usually on a part-time basis, bringing with him his own instruments and supplies, and usually charging by the operation. The fees are usually lower than in an outside practice because the dentist's overhead is cared for, his practice is steadier, his bills are easier to collect and he can make a reasonable income at a reduced price. A variation of this basic plan permits the dentist to rent the office which the company has established upon the premises and conduct his practice exactly as he would elsewhere, though again usually at reduced fees.

Another procedure, found chiefly among large corporations with well-developed employe welfare policies, involves the use of a mutual benefit association. These associations are organized among the employes for the purpose of group purchase of medical and dental care, and often for a variety of other purposes, and, in the better examples, the

company management makes a contribution to the association either in the form of a sum equivalent to a percentage of the dues collected from members or in the form of space and equipment for the conduct of the benefit association's activities, or both. Mutual benefit associations are an old idea, an outgrowth of the activities of fraternal orders, friendly societies and the like, and in their earlier forms were private indemnity schemes, venturing, if at all, only into the more rudimentary curative forms of non-industrial medicine. When company managements became interested in them, the associations usually expanded to comprehend much more in the way of preventive medicine and dentistry, and the best of them now are fine examples of employer-employe cooperation.

Other plans for the allocation of the cost of dental service involve the insurance method already spoken of; pay-roll deductions where the only company contribution is convenient budgeting of the dental bill, and, finally, a few other arrangements, usually slight variations of the cooperative plan for dividing cost between employer and employe.

An interesting corollary to the study of costs is the fact that part-time dentists are employed almost four times as frequently as full-time dentists. Most dentists would like to have a private practice if it is economically feasible, and by working part time for a company, a young man new to a community can maintain a steady income while building up a practice. Because of this fact, the company can usually attract better part-time men than full-time men. An additional inducement to the dentist is the private practice which may be elicited later from the employes' families. This, however, is controversial because of ethical problems which arise in certain communities, and some companies definitely prohibit recruiting of patients through company channels by part-time physicians and dentists.

From the standpoint of the industrial organization, private practice keeps the dentist in competition and awake to new developments. It is possible for the management to evaluate his skill in terms of his success in private practice.

Some of the additional data available from the studies covered the following points:

1. Dentists are to be found in control of the professional standards of by far the majority of the dental services, while executive responsibility rests more frequently in the hands of a physician, personnel director or one or the other of them in combination with the dentist.

2. Only a few corporations reported that they had encountered any opposition on the part of local dental societies. On the other hand, an equally small number reported that they had consulted the local society at the time that their service was set up.

3. The study shows that a large majority of companies allow time for the performance of the dental operations specified in their service, without any deduction whatever for the time lost by the employe.

4. On the questionnaire, suggestions were solicited for the benefit of concerns contemplating the adoption of dental service. The most interesting observation that can be drawn from the replies to this question is that all the plants seem to be satisfied with their own plan, and any recommendations that they make are based upon the plan which they use.

5. The benefits to be obtained from and reasons for establishing dental service were taken up. This subject, which should be an interesting one, warrants little space at present because of the paucity of accurate statistics on the benefits to be derived from the service, and the vagueness with which inquiries upon this subject were answered in the various questionnaires. It is obvious that goodwill and efficiency are the chief motives encountered in the establishment of, and

the chief benefits to be expected from, dental services in industry, but few companies stress one motive to the exclusion of the other, and fewer yet can tell anything more than the obvious fact that their service continues in existence and is more or less appreciated.

An ideal dental service in industry is one established under the direction of the medical service and headed by a dentist in good standing in his local dental society and qualified in such fields as may be included within the service. To him should be given full responsibility for the quality of service rendered. There should be a system of complete and accurate records of the oral conditions of all employes, filed in an accessible manner and available to the employe, to the medical and dental services and to governmental agencies for identification purposes. This requires that a mouth examination be made of every applicant for a position, or presentation of a certificate from his dentist stating the condition of the applicant's mouth. The applicant should be required to have defects remedied before being engaged; or if he is without funds, he should, under most conditions, be given a definite time limit for completion of the necessary work. While it is desirable to have new employes entirely free of dental defects, it is probable that the medical department will find it necessary to set as a goal a condition short of the ideal. However no one should be accepted as an employe whose mouth shows gross lesions of any communicable disease or evidence of infection or any defect jeopardizing the health, especially one that might be aggravated by his new occupation.

A mouth examination of each employe should be made by the dentist every six months, bitewing diagnostic films being made and defects charted. A prophylaxis should be given by the dentist or by a hygienist, and the employe be referred to a private dentist for any reparative work indicated. He should be urged to obtain the necessary dental treatment, and time should be taken at this opportunity to educate him in the value of maintaining oral health.

The value of the diagnostic service to the employe should be sufficient to offset the element of compulsion which a company may apply. A recent survey shows that, lacking this compulsion, only about one-third of a given working force appear to be sufficiently interested in health to respond to the company's offer of dental service. Even among "examination services," however, almost one-half are optional, and the company undertakes the service primarily for the benefit of those employes who are interested in obtaining the benefits. It is true that the company does benefit from an optional service, but much less so than from a compulsory one.

Employes who are engaged in occupations requiring the use of lead or mercury, acids, radioactive materials or carbohydrates should have more frequent examinations. Employes receiving injuries to the teeth or supporting tissues and also those who have developed oral manifestations of occupational diseases, should be referred immediately to the plant dentist.

If further treatment is indicated, the employe should be referred to the hospital or to his own dentist; or the company officers should assist him to select a competent dentist. If the bill for service is to be paid by the industry, authorization for such service should accompany the application of the patient for treatment.

Certainly, many industries will find it unnecessary to employ a full-time dentist, and it may be advisable to employ a hygienist who can relieve the dentist of the prophylaxis service. Arrangements for such service can readily be made.

The dental service should be adjusted to the needs of the community in which the employes are living. In general, the

company should not attempt to supply operative and other types of dental treatment which are available from the licensed dental practitioners of the community at fees which the employes can meet; nor should it interfere with the freedom of choice of practitioner on the part of its employes who are able to seek private treatment.

Much of the text of this paper has been taken from an article published recently in THE JOURNAL: "The Prevalence and Characteristics of Dental Service in Industry."

NEWS ITEMS

A DENTAL UNIT FOR THE ANZACS

IT is gratifying to announce the safe arrival at its destination of the mobile dental unit which was purchased, equipped and sent by members of the dental profession in America, and their friends, to their brother dental officers of the Fighting Anzacs. A cable from Cairo bringing the news of safe delivery in the "Middle East" says: "The vehicle will shortly be operating among our troops. Will you please accept and convey to all concerned our warmest thanks for this gift and our appreciation of the kind thoughts which inspired the contributions towards it." This message is transmitted by William V. C. Ruxton, president, British and American Ambulance Corps, Inc.

The unit consists of a twelve-ton truck, into which are built benches, foot lathes and equipment for prosthetic work, a foot engine and a chair, with surgical and general operative kit. A large quantity of materials for field dentistry, such as teeth, plaster, wax, filling materials and accessories, are securely packed. These were generously donated by the dental trade firms in the United States.

The American Dental Ambulance Committee, under the chairmanship of Henry S. Dunning, with Oscar J. Chase, secretary-treasurer, and in cooperation with the British and American Ambulance Corps, Inc., represented by Miss Nola Luxford, raised the necessary $8,000 for this project by direct appeal to our profession throughout the country. The completion of this undertaking is especially fortunate, since the Australians and New Zealanders in Greece and Crete lost most of their dental personnel and all of their dental equipment.

M. DON CLAWSON TO BE DIRECTOR OF THE SCHOOL OF DENTISTRY OF MEHARRY MEDICAL COLLEGE

M. DON CLAWSON will join the Meharry faculty as director of the School of Dentistry of Meharry Medical College, taking up his duties May 1. Dr. Clawson's appointment was made possible through the recent grant from the W. K. Kellogg Foundation for the development of a continuous education program at Meharry Medical College.

Dr. Clawson was, for a time, a colleague of Edward L. Turner, president of Meharry Medical College, while in Syria. He was professor of operative dentistry of the American University of

Beirut, Syria from 1930 to 1934. In 1934, he resigned his post at the American University of Beirut to take one of the most unusual posts ever held by a professional man. He was made director of the dental service of the Iraq Petroleum Company with headquarters at Haifah, Palestine. To carry on this new work, Dr. Clawson designed a portable dental unit that was mounted on two huge trucks. This unit was complete in every way, including x-ray equipment, dental laboratories, and dental operating chairs. It became his responsibility to give dental service to the employes of the Iraq Petroleum Company. His dental units were driven across the Syrian and Arabian deserts along the 1200 miles of pipe line from the Syrian and Palestinian terminals to the oil fields at Kirkuk in Iraq. Dr. Clawson and his assistants cared for the dental needs of the employes at the various pumping stations along the line and at the oil fields in Iraq and at the terminals on the Mediterranean coast.

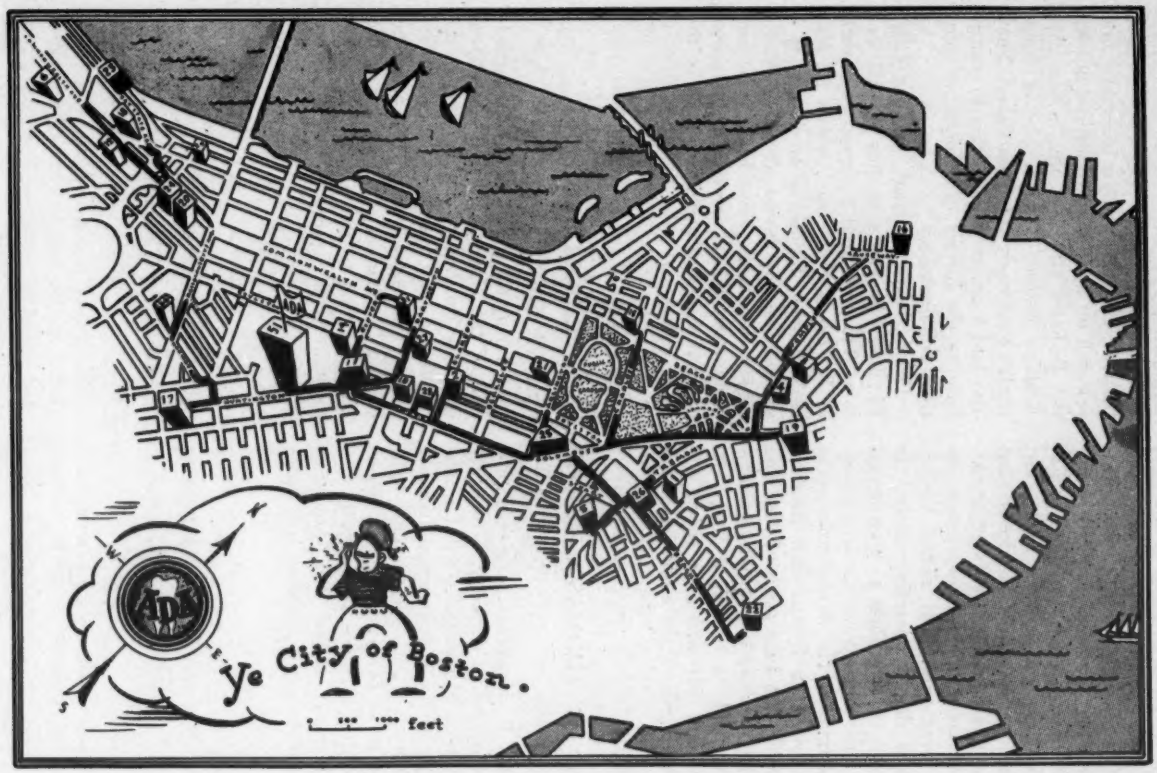
During this period, Dr. Clawson and his wife carried on some unusually fine research on the dental conditions among the Bedouin tribes of the Syrian and Arabian deserts. The results of these studies have been widely published. They also had a unique opportunity to contribute to the history of Phoenician dentistry and dental art.

Dr. Clawson, a native of Clay City, Ill., had his early schooling in that section. His predental training was taken at St. Louis University, where he also took some of his dental work. He is a graduate of the dental school of Washington University, St. Louis. In the early twenties, he served as a hospital apprentice and pharmacist's mate in the U. S. Navy.

THOMAS B. HARTZELL TO BE HONORED

THOMAS B. HARTZELL, emeritus professor of operative dentistry, University of Minnesota, Minneapolis, will be honored June 16 at a testimonial banquet commemorative of his seventy-sixth birthday, to be held in the Gold Room of the Radisson Hotel, Minneapolis.

Dr. Hartzell served the American Dental Association as Trustee and President during the period of the reorganization of the National Dental Association and has contributed much toward the promotion and conduct of dental research for many years. He practiced dentistry in Minneapolis from his graduation in 1893 to the time of his retirement, in April 1942.



1. HOTEL AVERY. 2. HOTEL BRUNSWICK. 4. HOTEL BELLEVUE. 5. HOTEL BRADFORD. 6. HOTEL BUCKMINSTER. 8. HOTEL COMMONWEALTH. 10. THE COPLEY PLAZA. 11. COPLEY SQUARE HOTEL. 12. KENMORE HOTEL. 14. HOTEL LENOX. 15. HOTEL LINCOLNSHIRE. 16. HOTEL MANGER. 17. HOTEL MINERVA. 18. THE MYLES STANDISH. 19. THE PARKER HOUSE. 20. HOTEL PURITAN. 21. THE RITZ CARLTON. 22. HOTEL ESSEX. 23. THE SHERATON. 24. THE SOMERSET. 25. HOTEL STATLER (A. D. A. HEADQUARTERS HOTEL). 26. HOTEL TOURAINE. 27. HOTEL VICTORIA. 28. HOTEL WESTMINSTER. 29. HOTEL FENEGATE. 30. HOTEL GARDNER. 31. HOTEL VENDOME. 51. MECHANICS BUILDING (EXHIBITS AND SECTION MEETINGS).

Bunker Hill Monument, Charlestown, Mass.

Whether you plan to spend your entire time attending

THE AMERICAN DENTAL ASSOCIATION
84th ANNUAL MEETING

August 24 to 28

or

you plan to spend some time in visiting the
many historic landmarks reminiscent of the nation's birth and early struggles.

BOSTON WELCOMES YOU

Send reservations immediately to
MAURICE E. PETERS, *Chairman*
Halls and Hotels Committee
American Dental Association
Convention Headquarters
Room 554, Statler Hotel
Boston, Massachusetts

GARDNER. 31. HOTEL VENDOME. 31. MECHANICS BUILDING (EXHIBITS AND SECTION MEETINGS).

American Dental Association

Boston, Mass. August 24-28, 1942

HOTEL RESERVATIONS

To secure hotel accommodations for the 1942 Session, consult the rate list on the next page and fill out the attached blank. Mail this immediately to the hotel of your first choice or to the Housing Committee, Room 554, Hotel Statler, Boston, Mass. Confirmation will be sent to you by the hotel.

Second and third choices of hotel should be indicated. If the reservation cannot be made at any of the hotels of your choice, the Housing Committee will place you in as favorable a hotel as possible and will notify you.

Please remember that a reservation constitutes a contract with the hotel to provide you with the accommodations you desire. If you find it impossible to carry out your part of the contract, namely, to occupy the room at the time agreed upon, please write or wire the hotel releasing the room, in order that it may be available for other members.

APPLICATION FOR HOTEL ACCOMMODATIONS

AMERICAN DENTAL ASSOCIATION

Boston, Mass. August 24-28, 1942

HOTEL.....1st Choice

HOTEL.....2nd Choice

HOTEL.....3rd Choice

Kindly reserve the following: ☐ Single room ☐ Double room ☐ Twin beds.

.....rooms with bath for.....persons $.....per room

.....rooms without bath for.....persons $.....per room

Arriving on August.....at.....a.m.....p.m.

ROOMS TO BE OCCUPIED BY:

NAME	ADDRESS IN FULL

NOTE TO HOTEL NAMED AS FIRST CHOICE: If the hotel of first choice is unable to make the reservation requested, this application should be forwarded at once to the Housing Committee, Room 554, Hotel Statler, Boston, Mass.

SCHEDULE OF RATES

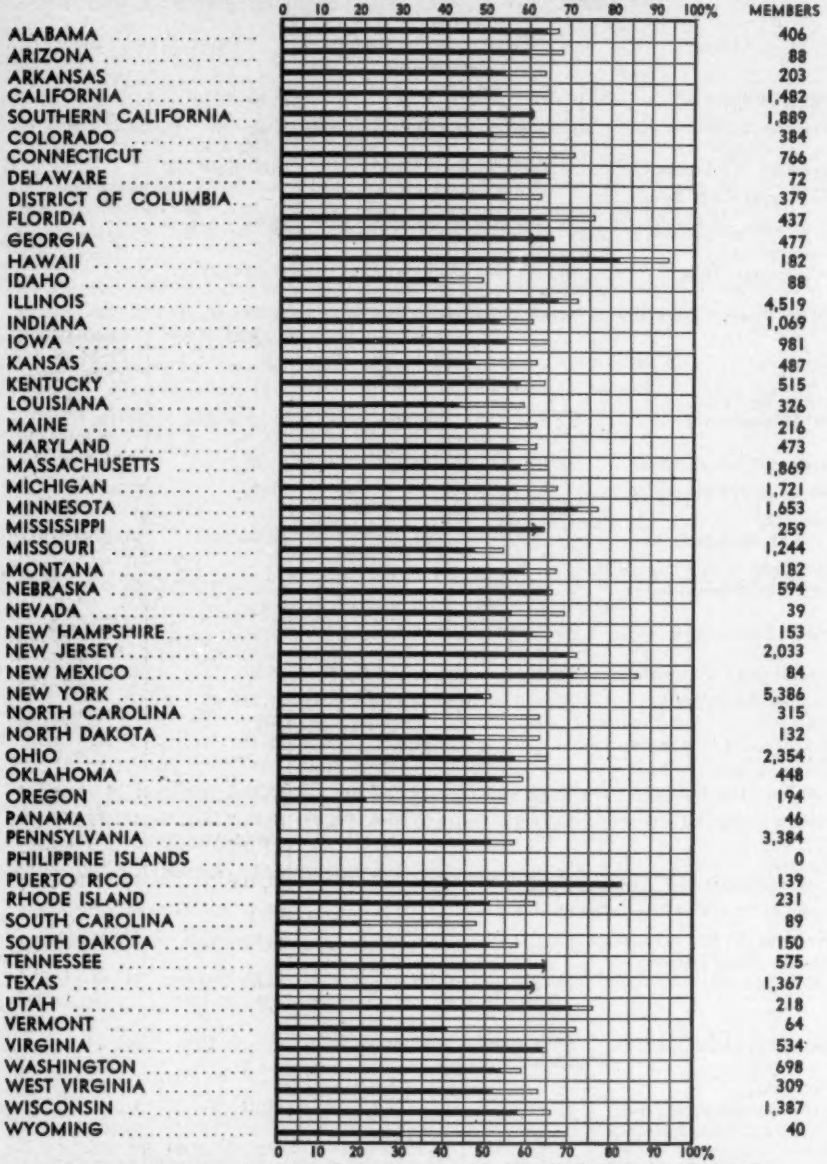
ALL ROOMS WITH BATH*

Hotel	Single	Double	Twin	Suite
AVERY, 24 Avery St.		$5.50	$6.60	
BELLEVUE, 21 Beacon St.	$3.85–4.40	$4.95–5.50–6.60	$5.50–6.60–7.15–7.70–8.80	$8.25–8.80–9.90
BRADFORD, 275 Tremont St.	$3.30–3.85–4.40	$5–5.50	$5.50–6.60–7.70	
BUCKMINSTER, 645 Beacon St.		$5		$7–12
COMMANDER, Cambridge, Mass.	$3.30–3.85–4.40	$4.40–5–5.50	$5.50–6–6.60	
CONTINENTAL, Cambridge, Mass.	$3.30–3.50–3.85–$4.40	$5.50–6	$5.50–6.50	$10
COPLEY PLAZA, Copley Square	$4.40–5.50–6.60	$7.70–8.80	$8.80–9.90–11–13.20	$13.20–15.40–17.60–19.80–22–24.20–27.50
COPLEY SQUARE, 47 Huntington Ave.	$2.75–3–3.30	$4.40–4.95–5.50–6	$5.50–6–6.60	$8–10
ESSEX, 695 Atlantic Ave.	$2.75–3.30	$4	$5.50	$7.70–8.80
FENSGATE, 534 Beacon St.			$5–8	$12–14
GARDNER, 199 Massachusetts Ave.		$4.40	$4.95–5.50	$6.60–8.60–10.60
KENMORE, 490 Commonwealth Ave.	$3.85–4.40		$5.50–6.60–7.70–8.80	$10
LENOX, Exeter Street	$3–3.50–4	$4–5–6	$5–6–7	$6.60–7.50–10–12–14
LINCOLNSHIRE, 20 Charles St.	$3.85		$6.60	$10–16
MANGER, North Station	$2.75–3.30–3.85–4.40	$3.85–4.40–4.95–5.50	$5.50–6.60	
MINERVA, 214 Huntington Ave.	$3	$4.50	$5	
MYLES STANDISH, 30 Bay State Road	$3.30–3.85	$4.50–5.50	$5.50–6	$7–8
PARKER HOUSE, 60 School St.	$3.85–4.25–4.40–4.95–5.50–6	$5.50–6.15–6.60–7.15	$6.60–7.15–7.70–8.80–9.90	$12–15
PURITAN, 390 Commonwealth Ave.	$4.40		$7.70	$9–12–14
RITZ CARLTON, 15 Arlington St.	$5		$8–9	$12–22–28
SHERATON, 91 Bay State Road	$3.30–3.85	$5.50	$5.50–6.60	$7.70–8.80
STATLER (Headquarters), Park Square	$3.85–4.40–4.95–5.50–6.60–8.80	$5.50–6.05–6.60–7.15–7.70–8.80–11	$6.60–7.70–8.80–9–9.35–10–12	$14.60–14.70–16.80–18–20–22–24.50–26.50
TOURAINE, 62 Boyleston St.	$3.85–4.40–5–5.50–6	$5.50–6–6.50–7	$6–6.50–7.25–8.25	$12–14
VENDOME, 160 Commonwealth Ave.	$3.30		$5.50	$10
VICTORIA, 271 Dartmouth St.		$5		$7.50–10

*Rates on rooms without bath by request.

Membership Page

PERCENTAGE OF DUES RECEIVED IN CENTRAL OFFICE AS OF APRIL 30, 1942, AS COMPARED TO 1941 MEMBERSHIP



Percentage based on dental population figures supplied by the State Society Secretaries.

1942 percentage. 1941 percentage.

OBITUARIES

SAMUEL C. G. WATKINS, D.D.S.
1853-1942

SAMUEL C. G. WATKINS, active in the dental profession for more than seventy-one years, died in his eighty-ninth year, at his home, 13 North Fullerton Ave., Montclair, N. J., March 11, 1942.

He was born March 27, 1853, near Hamilton, Ontario, Canada. At the age of 14, with his family, he moved to Detroit. Two years later, he went to Boston, where, in June 1871, he apprenticed himself to E. F. Whitman. After two years, he felt that he had learned enough to begin the practice of dentistry, and January 1, 1873, he opened his own office. It was not long before he realized that there was more to the profession than the training received under preceptorship, and in 1874 he matriculated in the Boston Dental College, graduating in the spring of 1875. He once more opened an office in Boston, but, a year later, he decided that he would like to establish himself near New York City, and, contacting the dental supply houses in New York and Newark, he was advised that there was no dentist in Montclair.

Dr. Watkins often delighted in relating how, for sixty-one years, his dental chair stood on the same spot, without being moved one inch, although he had several chairs during that time. He enjoyed good health, and prospered, and he looked back with pride upon the many kindnesses shown him and the honors bestowed on him by the dental profession.

Soon after his graduation, Dr. Watkins became active in furthering the development of dental societies, giving unstintingly of his time and energy to advance and improve the profession. He joined the New Jersey State Dental Society in 1877, serving as president in 1889-1890. In 1936, he was elected a life member. In 1879, he joined the American Dental Association, serving as Second Vice President in 1891, 1892 and 1893, and, in 1894, as First Vice President, acting as President in 1895. In 1880, he helped organize the Central Dental Association of Northern New Jersey, and he became president in 1887. In 1892, he joined the New York Odontological Society and the First District Dental Society, of State of New York, being elected a life member of the latter

SAMUEL C. G. WATKINS, D.D.S.
1853-1942

in 1922. It was he who conceived the idea of holding an International Dental Congress in Chicago during the World's Fair in 1893, and the initial steps were taken in his office.

Dr. Watkins was a generous contributor to dental literature, but he will best be remembered for the sectional headrest which bears his name and which was

part of the equipment of all of White's dental chairs up to 1910. Several sets of scalers, etc., are of his design.

In 1929, he published "Reminiscences of Montclair," relating his association with the various prominent men of that period. Those who knew him intimately and visited his home were immediately impressed with his cultural side. He "lived" with the various collections that he had gathered over his long period of professional life. These included an extensive collection of etchings and paintings by the best known artists of that period, among whom was George Innes. He always endeavored to obtain the original palette on which the paints were mixed, signed by each artist, and a plaster cast of the arm and hand of each. He also owned an extensive collection of valuable oriental rugs. His collection of canes used by prominent persons numbers in the thousands. He was likewise interested in early Americana, some of the items being pewter and Indian artifices. Perhaps the most important collection is his autographed letters.

When he retired from active dental practice, Dr. Watkins could not content himself with a life of idleness, and he entered on an undertaking which many in the profession consider one of his greatest contributions to dentistry. In May 1931, he presented to the Library of the Academy of Medicine the first three volumes of his scrapbooks, totaling 618 pages, and, in 1935, the thirteenth and fourteenth volumes. These dental scrapbooks consist of pictures and obituary notices of dentists, and pictures of or articles by or about many prominent living dentists. They are remarkable for their thorough preparation and the complete cross-indexing of each volume. In the preface one reads:

> These books were not compiled for the purpose of making a profit but for the pleasure it gave me in thinking over and looking at the pictures and reading the articles about and talking to so many of my old friends in the profession and making a record of the things of the past. I have had a feeling for a long time that if I did not make a record of these things which seemed to be passing out of existence very fast they would be lost to future generations.

There is scarcely an important dental library that does not contain one or more of these books. In the last three or four years, Dr. Watkins prepared for the library at the academy four such volumes that related entirely to medicine. In compiling these volumes, he leaves a living monument to the deeds of the pioneers in words that cannot be inscribed upon stone. The material is the story of dental journalism of the past and the life history of those who contributed to it.

Throughout his professional life, Dr. Watkins gave freely of his time. He was respected and beloved by all who knew him. His fine character and high professional ethics gained for him the esteem of his fellows and the devotion of a large clientele. He was an inspiration to all who came in contact with him.

Surviving are the widow, Jessie Cullen Watkins, a daughter, Ann Watkins Basson, of Meredith, N. H., and a son, Lawrence D., of Los Angeles.

BERNHARD W. WEINBERGER.

CHARLES BUNTING COLSON, M.D., D.D.S.

1858-1942

CHARLES BUNTING COLSON died unexpectedly at his home in Charleston, S. C., January 16, 1942.

Born in Charleston April 15, 1858, Dr. Colson was the son of Charles Frederick Colson, master of Confederate blockade runners during the Civil War, and Eliza Hislop Taylor Colson, both of Charleston. Dr. Colson recalled how his father worked all day at his rice mill and then served all night with the militia; passing tense hours of watching for signals from the blockade runners.

At the close of the siege of the city, the ration line formed near his home.

Dr. Colson received his dental degree in 1878 from the Philadelphia Dental College and Hospital of Oral Surgery, a branch of Temple University, in Philadelphia. In 1879, he was graduated, with the degree of doctor of medicine, from the Medical College of the State of South Carolina.

Dr. Colson, physician and dentist, the ideal combination, practiced only dentistry. He began practice in 1878 and for sixty years occupied one office, in Charleston, until his retirement, in 1940. Up to his death, he maintained a laboratory in the same building for manufacture of the Colson dental poultice, which he introduced about fifty years ago.

His life was an active one, of various interests. He was a charter member of the Charleston Dental Society, which he served as president. He was also a past president of the state dental association.

He was an enthusiastic member of the German Friendly Society, the St. Andrew's Society and the South Carolina Society. He was a member of the First (Scotch) Presbyterian Church.

Surviving are the widow, Ida Blair Davis Colson; a daughter, Ida B. Colson; two sons, Lieut.-Col. Charles Colson, United States Army, and Ernest Bunting Colson; nine grandchildren, and two great grandchildren.

N. W. M.

LEONARD F. POGUE, D.D.S.

1899-1942

LEONARD F. POGUE was born August 19, 1899, in Obion, Tenn.; died February 18, 1942, at the age of 42 years.

He was graduated from Central High School in Nashville, Tenn., in 1917; attended Peabody College for a year, and then entered Vanderbilt School of Dentistry, in 1919, graduating with honors in the class of 1923. He taught in the school full time in 1924 and part time in 1925. He completed a course in children's dentistry in Minneapolis in 1925, after which he opened an office in the city of Nashville, with a practice limited to children's dentistry. In 1926, he completed a course in the Dewey School of Orthodontia in New York, thereafter limiting his practice to these two specialties.

Dr. Pogue was a member of the American Dental Association and the Tennessee State Dental Association, and had held the offices of president, and secretary-treasurer of the Fifth District Dental Society, as well as serving on numerous committees for both state and local societies. He had been general chairman for the past three years for postgraduate seminars held under the auspices of the Tennessee State Department of Public Health and the state dental association, and was at the time of his death formulating plans for Tennessee's fourth annual seminar. He was a member of the Tennessee State Board of Dental Examiners at the time of his death, and likewise held membership in the Nashville Academy of Medicine.

He was a member of the Kappa Sigma Fraternity, the Delta Sigma Delta Dental Fraternity and the Omicron Kappa Upsilon Honorary Dental Fraternity, having served it as secretary and treasurer.

"Leonard," as he was affectionately known, was a man of deep sympathy and many interests; a man with the characteristics of leadership. An undertaking assigned to him was received as worthy to be well done.

GEORGE EVANS

(1843-1942)

GEORGE EVANS, dentist, author and clinician, well known in the 1880's and 1890's, died at his home in New York January 12, 1942. He was born in Cork,

Ireland, of English, Welsh and Irish parentage, in 1843, and was brought to Boston, Mass., by his father in 1849. He came to New York in 1850.

In the summer of 1859, he started to work as a mechanic and handyman for John Allen, inventor of continuous gum-work, having previously attended the College of the City of New York for a year or two. He expected to continue his studies there, but became interested in Dr. Allen's work and decided to take up dentistry.

He spent much time with Drs. Allen and Roberts on Bond Street, acquiring his practical as well as theoretical knowledge of dentistry by preceptorship. In 1863, having completed his studies, he started in practice for himself, but he did not sever his ties with Drs. Allen and Roberts for some time. His first office was on Twenty-Fourth St., near Eighth Ave. There, he restricted himself to the extraction of teeth, using nitrous oxide gas, which he manufactured himself. (He also made the apparatus that he used.) Subsequently, he extended his activities to full dentures and, still later, to partial dentures and the general practice of dentistry. In 1880, he established himself at 133 West Thirty-Fourth St. About this time, he began to interest himself in crown and bridge work. Having realized the important place that organized dentistry was bound to take in shaping the conduct and advancement of the profession, he began to attend dental meetings regularly, not only in New York, but also all over the country. Several years later, he became an active participant in various dental meetings and published articles on crown and bridgework. This interest culminated in his book, "Crown and Bridgework," published in 1888. The book subsequently appeared in nine revised editions, the last in 1922. It was translated into all the principal languages.

Dr. Evans was the inventor of the gold seamless contour crown, for which he was granted several patents in the United States and in England. He also invented a cotton holder and dispenser and various other dental instruments and technical tools; the best known among them being the Evans root-canal dryer and the Evans root trimmers. He was admitted to the U. S. Court as an expert on dental patents.

He was the first special lecturer on crown and bridge work, at the Baltimore College of Dental Surgery, where he remained twelve years. He later lectured at the New York College of Dentistry and the College of Dental and Oral Surgery of New York, also at the University of Pennsylvania and the Royal College of Dental Surgeons at Toronto. He wrote numerous articles and read many papers on various dental subjects, and he served two terms as a member of the New York State Board of Dental Examiners.

Dr. Evans was a life member of the First District Dental Society and a member of the New York State Society and of the American Dental Association; a Fellow of the American Academy of Dental Surgery and of the American College of Dentists, and an honorary member of the Psi Omega Fraternity. He was a Mason and belonged to several clubs in New York. At the time of his death, he was the oldest member of the Lotos Club, which he had joined in 1874. He retired from active practice in 1924. His wife, Leonor de Sutton Evans, whom he married in 1884, died December 26, 1941. Surviving are his son, George Evans, Jr., a dentist of New York City, a daughter and three grandchildren.

MILTON D. BARKANN.

DEATHS

BACHMANN, A. J. A., Chicago, Ill.; Northwestern University Dental School, 1904; died December 14; aged 59.

BADANES, BERNARD B., New York, N. Y.; New York College of Dentistry, 1907; died January 3.

BARTH, WILLIAM H., Great Falls, Mont.; Northwestern University Dental School, 1899; died in April; aged 67.

BRAND, THOMAS T., Urbana, Ohio; Indiana University Dental College, 1896; died December 18; aged 76.

BROWN, ARTHUR I., Cleveland, Ohio; Western Reserve University School of Dentistry, 1904; died January 9; aged 70.

EARLY, JOHN C., Dayton, Ohio; Ohio State University College of Dentistry, 1900; died April 1; aged 74.

ECKER, M., New York, N. Y.; New York College of Dentistry, 1911; died March 20.

HAIGHT, S. DOUGLAS, Coshocton, Ohio; died February 19; aged 84.

HOUCK, JOHN W., Scranton, Pa.; University of Pennsylvania School of Dentistry, 1901; died December 27.

HURLBUT, H. H., Missoula, Mont.; died March 8; aged 90.

LEDERLE, JOHN P., Chicago, Ill.; Chicago College of Dental Surgery, 1901; died March 7; aged 68.

MCCORMICK, LESLIE T., Stapleton, N. Y.; University of Pennsylvania, School of Dentistry, 1923; died April 15.

MOTT, CARLTON BURNS, Morganton, N. C.; Baltimore College of Dental Surgery, 1903; died recently; aged 62.

PERPENTE, ALBERT STEVENER, Ridgefield, N. J.; University of Pennsylvania School of Dentistry, 1911; died April 14; aged 63.

POGUE, LEONARD F., Nashville, Tenn.; Vanderbilt University School of Dentistry, 1919; died February 18; aged 42.

RAFFENSPERGER, EDWIN H., Marion, Ohio; Pennsylvania College of Dental Surgery, 1880; died December 28; aged 81.

REID, THOMAS, Chicago, Ill.; Northwestern University Dental School, 1899; died November 7.

SITES, EDWARD F., Fort Wayne, Ind.; University of Michigan School of Dentistry, 1879; died April 17; aged 87.

WARE, J. STRATTON, Bayonne, N. J.; Temple University School of Dentistry, 1897; died recently; aged 65.

WASSERMAN, SAMUEL B., Philadelphia, Pa.; Temple University Dental School, 1932; died April 5; aged 33.

WEBSTER, JAMES BURNS, Atlanta, Ga.; Atlanta Southern Dental College, 1911; died December 2; aged 75.

WELLS, CLAUDE E., Oak Park, Ill.; Philadelphia Dental College, 1891; died March 16; aged 71.

WILKIE, ADELBERT E., Havre, Mont.; Omaha Dental College, 1904; died May 1; aged 60.

CURRENT LITERATURE

Dental Health Education

By Richard J. Phillips

Public health is the foundation upon which rests the happiness of the people and the welfare of the nation. Dentistry is an important division of health service. An effective dental education program is necessary to create the desire for a clean, healthy mouth and to do away with neglect of the oral cavity. While educating the paying public to the idea of regular dental attention, we must realize that we are educating a class of people also whose financial status will not permit dental attention as a part of their budget. Many plans have been offered and some have been tried, but as yet none have been satisfactory to both the dentist and the public. Whatever the plan for administration of public dental service, if there must be a choice between care for adults and care for children, the children must come first. Preventive dentistry must start with the children. The best way to preserve adult mouths is to instill in the child the desire for a clean, healthy mouth. If we achieve this end among school children, we will assure healthy mouths among the adult population of the future. Our goal should be to improve the oral health of the public as a whole, and that can be achieved only by a continuous and effective program of dental health education.—*Contact Point,* 19:139-142, January 1942.

R. J. Phillips.

Dentistry in Manchukuo

By Olga A. Gariaeff and J. E. Owens

Forty-five years ago, dentistry in Manchuria was in the hands of the barber surgeon, and not until 1910 did the first dentist come to Manchuria. The two schools of dentistry, which have very similar curricula, were founded by Russian physicians and dentists who fled to Manchuria in 1917. The studies consist of a smattering of the basic sciences, contained in one typewritten book. The course is two and one-half years and the student learns very limited instrumentation and uses crude wooden operating chairs. Manchukuo dentists face a serious problem in the lack of educational background, as well as of equipment and materials. In 1939, dental education was taken over by the Japanese and it is now taught in Japanese.—*Contact Point,* 19:195-206, March 1942.

J. E. Owens.

Prevention of Dental Caries—a Public Health Service

By Meyer Klatsky

If dentistry is to become a health-dispensing profession, it must receive due recognition, not only from the medical profession, but also from the general public. The public is reluctant to accord this recognition because the dental profession has failed to solve the vital problem of caries prevention.

There are five chief factors in the development of dental caries; namely, acids, acid-forming micro-organisms, food débris, plaques and areas of increased susceptibility. The old methods of caries prevention are ineffectual because they do not strike at the root of the evil. They are more palliative and curative than preventive.

We learn from anthropologic studies that ancient and primitive races suffer little from caries. Their masticatory apparatus is well developed by proper use and exercise. The disuse of the masticatory apparatus of civilized man, caused by the substitution of liquid, soft, non-fibrous foods for naturally hard, solid, resistant foods, is mainly responsible for the great prevalence of dental caries. Only a radical change in the physical consistency of the food that we consume, and a revision of our culinary art and of the manner in which our food is masticated will solve the problem. A well-developed, vigorous, properly functioning masticatory apparatus is the best means of preventing dental caries. —*D. Outlook,* 29:114-120, March 1942.

Meyer Klatsky.

Builders of Dentistry: E. M. Bluestone, M.D.

By DAVID TANCHESTER

THIS is a continuation of the Builders of Dentistry series, the subject being E. M. Bluestone, director of the Montefiore Hospital in New York, the largest philanthropic hospital for chronic disease in history. The author shows how important the biographic background of a hospital administrator can become in the development of a dental program and uses his subject in illustration. He has much praise for Dr. Bluestone, who trained under Goldwater and is now a veteran hospital executive. He has been highly placed in his specialty in the hospitals of this country and abroad. He has left his mark in every post that he has occupied and has been an influence for the best in dentistry at all times. His point of view regarding dental progress has been published on many occasions, and it is the soundest of its kind from the scientific point of view. He has consistently maintained the equality of oral surgery and dentistry with the other medical specialties. The article is amply illustrated by quotations from Dr. Bluestone's writings, and one is left with a desire to make a personal visit to the comprehensive and highly developed dental department of this unique hospital.—*D. Outlook,* 29:128, March 1942.

DAVID TANCHESTER.

A Dental History Society for New York

By WALTER H. JACOBS

THE first dental society was organized in New York City in 1834 (Society of Surgeon Dentists of the City of New York). New York City again led the dental movement when, December 11, 1933, a group met for the formation of the first society devoted to the study of dental history. This organization was called the New York Society of Dental History and Culture. From 1933 to 1937, it held fifteen regular meetings. Since 1937, interest has slackened, and now the society no longer functions. The value of the knowledge of dental history to the dentist is inestimable as it gives him a new insight into and inspiration in his professional work. A cultural challenge is again issued to the dentists of the city. Can and will they support a dental history club?—*D. Outlook,* 29:132-133, March 1942.

WALTER H. JACOBS.

Fractures of the Jaws and Facial Bones

By HARRY L. BISNOFF

PLASTER head casts have been used since the last war for the attachment of traction wires in fractures of the jaws, the facial bones and the nose. The various disadvantages of the use of plaster headcasts plus its contraindication in scalp injuries, and the special skill necessary for construction, make a leather headgear desirable. Nasal, malar, zygoma and jaw injuries require retention and stabilization, often best served by external appliances.

The fracture appliance unit here described consists of a ready made leather headgear designed to fit a wide range of head sizes and which accommodates various parts and attachments for the widest range of injuries. Its application can be made in a few moments by men of average skill, and the desired attachment placed therein to give traction or compression, as the case warrants, in widely variable directions. These parts can be applied in various combinations to care for jaw, nose or facial fractures. The headgear can be applied over scalp injuries and can be removed or released for treatment and quickly reapplied. Changes in angulation are easily made by screw adjustment. It is capable of producing traction in adjustable angles anteriorly and posteriorly. It can raise and retain the maxillae and aid in reshaping the nose by traction or controlled lateral compression.—*D. Outlook,* 28:343, August 1941; 29:77, February 1942.

HARRY L. BISNOFF.

Extractions in Orthodontia

By BENJAMIN M. LANCET

THE dentist or dental specialist must be ever aware of the great importance of the dental mechanism. Nature endows almost every individual with a normal complement of teeth. The normal number of teeth, whether twenty-eight or thirty-two, is needed to masticate food. The greater the number of teeth in the dental arches (up to the normal), the greater the possibility of satisfactory mastication.

Some orthodontists, under certain conditions prevalent in the mouth, may, in accordance with their diagnosis and mode of treatment, resort to extraction of one or more teeth. The author strives to maintain every

tooth present and to avoid extraction in the orthodontic treatment of any case regardless of the alinement of the teeth. To deprive the dental mechanism of its normal size or shape would have a bad effect upon the normal growth and development of the dental apparatus.—*D. Outlook,* 29:24-26, January 1942.

BENJAMIN M. LANCET.

Enameloid Acrylics

A "REVOLUTIONARY" material was evolved several years ago by the filling and coloring of clear methyl methacrylate for use as a denture base. Subsequent tests and trials fulfilled the high hopes held for the material. A correct technic and engineering principles are based upon the physical and chemical properties and reactions of the material used. For inlays, veneers, facings, jacket crowns and bridges, it has vital translucency, and is esthetic, non-friable and abrasion-resistant. Colors can be furnished as "key" or basic colors. Twenty-seven cover 95 per cent of the range of required shades. Physical properties of enameloid acrylics: specific gravity, 1.19; color fastness; polymerized acrylic softening at 257° F.

The powder (clear) polymer plus filler plus colors is plasticized by the monomer (liquid) into a soft mass which is polymerized (solidified) by the action of heat 170°-190° F. If the temperature is raised slowly, the acrylic is not porous, does not stain and has a Brinell hardness of 30.

Shrinkage (linear 0.53) is entirely overcome by overpacking and processing in a compensating press. Water absorption (0.0025) is negligible if the product is not permitted to dry out. Diolite is used for dies, ordinary Plaster of paris for investment. Sodium silicate sizing and sealing technic makes a perfect substitute for tinfoiling.—*D. Outlook,* 28:397-400, September 1941.

MAURICE N. STERN.

Enameloid Acrylics

PREPARATION is of the box type; with no slices, bevels or narrow isthmuses. Acrylic inlays used as abutments are veneered to a "monkey-cage" casting in gold. Ivory inlay wax is used for direct or indirect technic. An explorer and a wire paper clip are fashioned into an instrument to facilitate handling direct inlay patterns. The pattern is painted with soft plaster of Paris (investment) and floated on the surface of investment in the lower half of the flask. A counter is poured and, when set, the wax is boiled out and the mold sized and sealed. Dies for indirect inlays are made of diolite. The waxing-up is direct to the die, and investing the die proceeds the waxing. The counter is poured and dewaxing is carried out, with sizing and sealing as for direct inlays.

The wet mass packing method gives perfect color control. The case is overpacked and tested with hydrophilic cellophane. All excess that is interposed between the halves of the flask must be removed to avoid neutralizing overpack pressure. Processing is done in a compensating press, the case being brought to the boiling point in thirty minutes and boiled for fifteen minutes. Cooling is accomplished before release of pressure. Final trimming and polishing are done in the tooth. Cementation is carried out with a mixture of translucent (porcelain) and oxyphosphate cements.—*D. Outlook,* 28:540-545, December 1941.

MAURICE N. STERN.

Enameloid Acrylics

IN the gold crown abutment on a bridge, all visible gold should be cut away. The "inlay" veneer is prepared in the acrylic process, and the inlay cemented to place. Similarly, gold inlays *in situ* can be made more esthetic. Fractured porcelain facings (interchangeable) can be replaced by unbreakable acrylic. Pin facings are replaced in acrylic after preparation of slots in the backing to get resistance form for retention. Loss of lower anterior teeth can be corrected by the use of shoulderless jacket crown abutments. A metal template of the true subgingival dimension (under the free margin of the gum), by its physical presence as an integral part of the waxed-up pattern, carries the pattern to the mold, where it is replaced by acrylic, a smooth, non-irritating lap-joint resulting under the gum. The conventional shoulder type jacket crown is used in most cases, especially when jacket crowns are used for bridge abutments and more bulk is needed for the cast coping that forms part of the grid structure, reenforcing the bridge.

Jacket crowns are invested without dies

in plaster investment; submerging only one-third of the interproximal surfaces. This detail of investment is important for proper color control. The counter is poured and the case dewaxed, sized and sealed ready for packing.—*D. Outlook,* 29:9-13, January 1942.

MAURICE N. STERN.

Enameloid Acrylics: Color Control

COLOR control is dependent on a proper range of colors and a knowledge of the principles involved in color in acrylics. First, twenty-four colors (key) will satisfy 95 per cent of all required shades. Secondly, there are two types of human teeth, relatively opaque and translucent teeth. The opaque type are made with two different shades, one for the gingival and another for the incisal aspect. The translucent types have one color for the gingival or body color and a dilution of the same for the incisal.

The wet technic affords definite control of the filler and color in the mixture and prevents washing about of colors. The placement of the body and incisal sections of the mass will also help determine the final color result especially in dilute (translucent) incisal overlays.

Mock fillings, check lines and decalcification areas are placed at the time of test packing. All metal parts of copings or grids are first treated with an opacifying acrylic paint. Sizing and sealing solutions are both made with sodium silicate (specific gravity 1.380). Solution 1 is ten parts water to one part sodium silicate. Solution 2 is one part water to two parts of sodium silicate.—*D. Outlook,* 29:73-76, February 1942.

MAURICE N. STERN.

Enameloid Acrylics: Bridges

AN all-acrylic bridge should be the exception, reenforced (grid) acrylic bridges the rule. The weakness lies in the thin areas around jacket crown abutments, not, as a rule, in the pontics. Cantilever bridges should never be used unless the distal or free end is secured by a well-supported lug or rest. Reenforcements or grids are made of gold inlays, cast three-quarter crowns or cast copings joined together by either cast gridwork across the pontic span or span grids made in the form of I, T or L beams. These can be made of 0.025 gage monel metal, soldered with 585 or 615 gold solder, with borax as a flux.—*D. Outlook,* 29:125-127, March 1942.

MAURICE N. STERN.

Hot on the Inside and Cold on the Out side—Acute Alveolar Abscess

By WILLIAM H. HYDE and I. H. L. SHLEFSTEIN

THE acute alveolar abscess and its sequelae are the commonest of dental infections. Confusion regarding proper treatment in the various stages leads to indiscriminate use of hot intra-oral washes combined with cold extra-oral applications. There is little scientific basis for this procedure and much clinical evidence against it. The baseless fear of complications keeps the dentist from early extraction and early drainage of the bacterial focus of the acutely abscessed tooth.

The division of this condition into three stages, each with its bacteriology, pathology and clinical picture, helps determine the treatment. The presence of streptococci and an absence of fluctuation characterize the early stages. Fluctuation is late and the alveolar plates have been perforated by bacteria. The principle of treatment is incision and drainage, by a root canal opening, extraction of the tooth or cutting with the knife. General anesthesia, a minimum of trauma and insertion of a drain carrying sulfonamides limit postextractive complications.—*D. Outlook,* 29:158-164, April 1942.

Evaluation of Anesthetic and Surgical Risks in Dental Practice

By MATTHEW LOZIER

THOUGH there are few absolute contraindications for the use of nitrous oxide-oxygen and procaine-epinephrine in dental ambulatory patients, from time to time conditions arise in which a special method of approach is imperative.

It is essential, therefore, that the practitioner possess the training and ability to handle patients with dyscrasias such as cardiac deficiency, anemia, hemorrhagic disease, hypertension, hypotension, arteriosclerosis, apoplexy, hyperthyroidism, diabetes, status lymphaticus and thymicus, asthma, pulmonary diseases, nephritis and uremia, as well as to know how to deal with patients of extreme age with infections of the neck and air passages or with Cheyne-Stokes breathing;

alcoholics, drug addicts; epileptics; the insane, and the pregnant, lactating or menstruating patient.

To facilitate diagnosis and establish a definite course of procedure, the following questions are pertinent: 1. What are the symptoms present? 2. What information is necessary to confirm the tentative diagnosis? 3. What further clinical investigation should be made? 4. What preoperative safeguards should be taken? 5. Is premedication advisable and, if so, what should it be? 6. What anesthesia technic is most suitable in this case? 7. What postoperative safeguards are indicated?—*D. Outlook*, 29:15-24, January; 82-90, February 1942.

MATTHEW LOZIER.

Pyorrhea Alveolaris and the Ductless Glands

By PAUL RUDMAN

IN the stomatology service of St. Antoine's Hospital in Paris, the author had the opportunity of observing 124 patients affected with pyorrhea alveolaris. His clinical research indicates that 100 per cent of patients showing endocrine disturbances also have periodontitis, and that 60 per cent of patients with pyorrhea have clear-cut, well-established endocrine disturbances. Dr. Rudman believes that the dental pulp plays the principal rôle in the evolution of pyorrhea and that the dental pulp must be considered a gland of internal secretion. He believes further that in pyorrhea alveolaris, the endocrine disturbance has repercussions in the dental pulp.—*D. Outlook*, 29:14, January 1942.

Leaded Resinous Applicator for Intraoral and Extraoral Radium Therapy

By J. E. PYOTT, V. F. J. BRUDER, W. J. MANION and G. E. WARD

THE leaded resinous applicator is designed not only to protect normal structures, but also to retain radium or other radioactive matter in the area requiring treatment. It consists of a base of acrylic resin into which is cemented a lead protective chamber approximately 2 by 1.8 by 1 cm., with walls at least 5 mm. thick. The chamber when in use is covered with a lead lid sealed in position with molten wax. The base is constructed to fit an impression of the region to be irradiated. Intraorally, retention is secured with the usual bars and clasps. The advantages are constant position, therapy by the broken-dose method, minimum exposure from handling by the technician, protection of normal tissues and comfort to the patient. —*Am. J. Roentgenol.*, 47:613, April 1942.

H. B. MCCAULEY.

Tumors of the Palate

By H. MARTIN

OBSERVATIONS were made on 103 cases of tumors of the palate. The mean ages of patients having the tumors were: 60 years, for epidermoid carcinoma; 46 years, for adenocarcinoma, and 37 years, for benign mixed tumors. The duration of the symptoms prior to admission was seven months, for epidermoid carcinoma, a relatively short period as compared with the three years' duration in the adenoid group (adenocarcinoma and the mixed tumors). That these growths occur more often in the soft than in the hard palate is more evidently true of the epidermoid carcinoma. However, the mucous and salivary gland tumors are more frequently seen in the hard palate. The incidence of epidermoid carcinoma is greater in the male than in the female, but the reverse is true for the adenoid group. The factors in the two groups differ in that the epidermoid carcinoma gives evidence of subacute or chronic irritation; namely, from syphilis, tobacco addiction, trauma from dentures and stomatitis following dietary deficiencies, as seen in avitaminosis B. Metastasis occurred in 43 per cent of malignant tumors before admission. This, however, was found more often in the epidermoid carcinoma than in adenocarcinoma. Surgical operation was recommended as the treatment of choice.—*Arch. Surg.*, 44:599, April 1942.

V. H. POWELL.

A Method of Conservative Local Anesthesia for Conservative Dental Surgery

By N. A. SIGGERS

IN the intraosseous injection, a very efficient method for simple operations, the mucosa over the area to be injected is dried and a surface anesthetic applied. The needle is then inserted in the periosteum, and a few drops of anesthetic deposited. After this, a No. 5 reamer in a contra-angle handpiece is

placed in the center of this spot, and pushed through the gum and periosteum with firm pressure, until it is felt to be in close contact with bone. This is now drilled through, with light pressure. The reamer will be felt to fall into an apparently open space, the cancellous bone. The reamer is removed and the needle inserted in the opening remaining. The adaptation must be close to avoid leakage, and the solution must be deposited very slowly in order to prevent pain. One cubic centimeter is sufficient, and it will be found, in most cases, that there is complete anesthesia for from twenty to thirty minutes. The anesthesia may be extended by additional injections through the same hole.

One of the chief disadvantages of this method is the difficulty of access to certain teeth, particularly the lower second and third molars. The advantages of this technic are rapid onset, complete anesthesia of the pulp and surrounding nerves, limiting of the area of anesthesia and a low incidence of undesirable sequelae.—*Brit. D. J.*, 72:164, April 1942.

V. H. POWELL.

Fusospirochetal Organisms and Tonsillitis

By J. F. LEWIS

NINE cases are presented from a series of about forty cases of acute or chronic tonsillitis. Bacterial smears of mucopurulent material aspirated from the tonsils in eight of the nine cases showed Vincent's organisms ranging widely in numbers present. Aspirated material frequently shows considerable numbers of fusospirochetal organisms, while smears from swabs of the same tonsils show only insignificant numbers of the organisms. It was believed that the clinical course and response to arsenical and bismuth therapy indicated that the Vincent organisms were important etiologic factors. However, in one case, arsenicals were not effective in reduction in number of the organisms. Treatment was effective in one case in which typical organisms were never isolated. In another case, the effect of treatment was not observed directly. Finally, one individual continued to harbor many organisms without recurrence of sore throat.

It was concluded that Vincent's organisms (with other bacteria) are present in greater or less number in most cases of tonsillitis. Parenteral administration of bismuth compounds, which was found to be highly effective in the treatment of tonsillitis, is recommended in severe cases.—*Arch. Otolaryng.*, 35:587, April 1942.

J. E. GILDA.

Anachoretic Effect in Pulpitis

By L. R. BOLING and H. G. B. ROBINSON

THE teeth of cats were irritated by the placing of croton oil in deep cavities and became infected. They exhibited varying degrees of disease when bacteria were introduced into the blood stream or when infections were present in other parts of the body. No morbid tissue changes were observed when bacteremia was present in the absence of irritation.

A definite relation was established between duration of the infection in the presence of irritation and the severity of the resulting lesion. Since no such relation could be established with the duration of irritation, it is concluded that the presence of bacteria is the important factor. There is evidence that the invading bacteria are blood borne except in cases of pulp exposure or when bacteria penetrate dentinal tubules beneath dental caries.—*Arch. Path.*, 33:477, April 1942.

J. E. GILDA

Leontiasis Ossea

By G. K. KIRKLAND

LEONTIASIS ossea is a condition of hyperostosis of the facial and cranial bones of obscure etiology. Although some evidence would associate it with Paget's disease, it is most probably distinct from this condition. Diagnosis is easy in advanced cases, but, in early cases, differentiation from Paget's disease may be difficult. The condition usually begins insidiously, often in late childhood or adolescence. The skull gradually increases in size, with usually one or more areas of localized increase, particularly in the frontal region, giving the appearance of bulging of the forehead. Headaches usually commence at an early stage in the disease and are paroxysmal. Nasal obstruction and interference with chewing are early, and possibly serious, symptoms. Various symptoms may occur as the disease progresses. In one of two cases reported, all the facial bones were

affected except of the right maxilla. The left maxilla showed a large boss, which destroyed the symmetry of the face. Huge bosses enlarged the mandible. The left maxilla encroached on the mouth, one of the teeth being carried so far inward that it appeared to be suspended from the middle of the palate. The teeth were in poor condition and were so irregularly displaced that they did not occlude on closing the mouth. Despite this, the patient was able to eat ordinary food with little difficulty.—*Brit. J. Surg.*, 29:74, July 1941.

J. E. GILDA.

Increase in Hardiness of Dentin on Drying

By V. P. TOTAH

MICROHARDNESS was determined in a series of eighteen tooth slabs in the moist and dry states. Ten readings were taken for each microcut and it was found that the average width of the microcut was less for the dried than for the moist dentin. The average width of the microcuts for all of the moist slabs was 12 microns and for the dried slabs 9 microns. The dentin microhardness, according to the Bierbaum scale, was increased on drying from 75 to 129, an average increase of 42 per cent.—*J. D. Res.*, 21:99, February 1942.

JAMES T. GINN.

Chronic Ulcerative Lesions of the Mouth

By E. L. KEYES

A STUDY was made of 2,077 mouth lesions seen at the Barnard Free Skin and Cancer Hospital or clinic over a period of thirty-seven years, with, in addition to this group of pathologically diagnosed mouth ulcers, 593 cases taken from private practice. Of the first series, 1,561 were malignant, an incidence of 75.2 per cent; in other words, three of every four chronic ulcers. Of these, twenty-eight were sarcoma, eight adenocarcinoma, two basal cell and the remainder (1,523) squamous cell carcinoma. Of the 2,077 lesions, 180 were benign neoplasms. The majority of benign growths comprised sixty-three epulides and fibroma, thirty-eight angiomas of various types, twenty-nine papillomas, two polyps and twenty-six cysts. Of 186 inflammatory ulcers, 148 were simple inflammatory lesions and thirty-seven granulomatous, including tuberculous and syphilitic lesions. Degenerative lesions, 150 in all, consisted of sixty-two cases of leukoplakia, fifty-nine of hyperkeratosis and twenty-nine of hyperplasia.

The high incidence of malignancy emphasizes the importance of early diagnosis. It means, to the practitioner, or dentist, that any ulcer of the mouth which fails to heal within a week or two is probably cancerous. Obviously, any such lesions should be viewed with suspicion and measures to determine its real nature should be instituted immediately. —*Am. J. Surg.*, 66:70, April 1942.

J. E. GILDA.

Human Saliva. XII. Effect of Flavored Activators on Salivary Flow and Calcium and Phosphorus Composition

By HERMANN BECKS and W. W. WAINWRIGHT

THE rate of flow and the calcium and phosphorus values of resting saliva were compared with those of activated saliva of four individuals. The activators used were: paraffin, pure chicle and gums of various flavors. The method of activation consisted of chewing one activator for three successive periods of 450 chews each. The results with paraffin activated saliva served as a basis for a comparison with those obtained by the use of other activators.

It was found that the rate of flow was increased considerably by paraffin activation, with a decrease in calcium and phosphorus values. This was followed during successive stimulation by a drop in the flow and the calcium and phosphorus values. The chewing of chicle did not cause such a marked increase in the rate of flow, and the calcium and phosphorus values decreased initially, but to a lesser degree, with a tendency of the third sample to return to the resting saliva level. The chewing of flavored gums induced a high rate of flow, far above that for paraffin. The rate fell below that for paraffin by successive stimulation. The use of these activators caused an increase in the calcium content, but the phosphorus content decreased in a manner similar to the decrease in paraffin activation.

The authors conclude that the increase of calcium in activated saliva is the result of an elective response of the salivary glands to

the different flavors of gums. They suggest that calcium and phosphorus concentrations in mixed human saliva can be changed as desired by the use of various types of activators.—*J. D. Res.*, 21:87, February 1942.

JAMES T. GINN.

Abrasion of Dental Gold Alloys

By E. W. SKINNER and R. L. LASATER

IN a study of the abrasion of six dental gold casting alloys, in both the "softened" and the "hardened" condition, and tooth enamel, a Pepsodent abrasion testing machine with a soft rubber eraser was used in applying the abrasive, 50 gm. of 200-mesh carborundum powder suspended in 30 cc. of glycerine. All specimens were subjected to 100,000 strokes for each determination. The mixture was renewed after every 5,000 strokes. It was found that hardening of the gold alloys by heat treatment decreased resistance to abrasion. Tooth enamel was found to be more than twice as resistant to abrasion as the most abrasive resistant alloy. Five of the alloys in the softened condition indicated a proportionality between the amount of abrasion and the Brinell hardness number. Three alloys showed that the amount of abrasion was directly proportional to the Brinell hardness number when the alloys were compared individually in the "softened" and "hardened" conditions. The amount of abrasion of the gold alloys after annealing was directly proportional to their respective specific gravity values, but this relation did not exist after age hardening.—*J. D. Res.*, 21:103, February 1942.

JAMES T. GINN.

Past and Present Methods and Results of Sugar Analysis of Saliva

By D. YOUNG

THE saliva of eighteen healthy persons, five of whom were edentulous, was tested for sugar by the drop-scale quantitative method developed by Heck, Brown and Kirk. This method can be used for the determination of glucose in a sample to amounts in excess of 1 microgram, and it can be applied to mixed human saliva. It was found that, in these selected cases, the glucose content ranged from 11.28 to 28.08 mg. per hundred cubic centimeters in resting saliva and from 14.04 to 30.00 mg. per hundred cubic centimeters in activated saliva. The author concludes that saliva contains glucose under normal conditions, and it is suggested that this method offers the possibility not only of measuring the amount of sugar present in the saliva, but also of investigating the rôle of salivary sugars in the development of dental caries and the influence of sugar intake on local bacterial growth.—*J. D. Res.*, 20:597, December 1941.

JAMES T. GINN.

Fluorine Therapy for Exposed Dentin and Alveolar Atrophy

By E. H. LUKOMSKY

THE use of fluorine in treating exposed dentin was based upon the assumption that such tissue cannot endure long contact with external media without pathologic changes, such as hyperesthesia, infection and decay. The author has used fluorine extensively in filling root canals, surface application to exposed dentin in any location and deep cavities. It was found that the pain caused by operative procedures, erosion, abrasion, the presence of clasps and exposure of gingival dentin and hypersensitive dentin was eliminated in most cases by the application of fluorine. It was found that fluorine was effective in eliminating pain associated with cavity preparation in 96.2 per cent of cases.

Fluorine therapy was used in the treatment of progressive alveolar atrophy. The stains and deposits were removed from the teeth and a 1 per cent solution of pure sodium fluoride was prescribed, to be used for a period of thirty days. The dose given was 5 drops of the solution three times a day, or 8 drops before meals two times a day. Under this treatment, many subjective symptoms disappeared and the teeth became firm. In all of his work with fluorine, the author has never seen a case of fluorine intoxication. —*J. D. Res.*, 29:649, December 1941.

JAMES T. GINN.

Human Saliva. XI. Effect of Activation on Salivary Calcium and Phosphorus Content

By HERMANN BECKS and W. W. WAINWRIGHT

IN an examination of the results of calcium and phosphorus tests with contrasting slow and fast flowing resting saliva, the

changes produced by paraffin activation and the fluctuation of calcium and phosphorus content of resting saliva and activated saliva were also investigated. The slower the rate of flow of resting saliva, the smaller the quantity of calcium and phosphorus secreted per time unit. The same holds true of resting saliva and activated saliva. For individuals with slow rates of flow, calcium shows less fluctuation during forty-five minutes' activation than for those individuals with fast rates of flow; while, for inorganic phosphorus, this picture is reversed. In human beings, the response of the salivary glands to paraffin activation in respect to milligrams per hundred cubic centimeters of calcium and phosphorus does not follow Heinhain's law.—*J. D. Res.*, 20:637, December 1941.

DAVID S. K. DAI.

Human Saliva. X. Fluctuations of Calcium and Phosphorus Content of Resting Saliva

By HERMANN BECKS and W. W. WAINWRIGHT

OVER a period of one to two years, an average of five salivary samples were collected from forty individuals. Half had a slow rate of flow of resting saliva, the other half a higher rate. The range of fluctuation depended mainly on the original level of rate of flow of resting saliva and the duration of collection time. Patients with contrasting rates of flow have distinctly different rates of calcium and phosphorus secretion or excretion. The lower the original rate of flow of resting saliva, the higher the average milligrams per hundred cubic centimeters and the lower the milligrams per hour of calcium and phosphorus values. The fluctuation of milligrams per hour figures is far greater than that of milligrams per hundred cubic centimeters figures. In the fluctuation of rate of flow of resting saliva, the low secretion group shows less fluctuation than the high secretion group. The rate of phosphorus secretion (mg./hr.) is influenced far less by an increase of rate of flow than is calcium. The milligrams per hour fluctuation is far less during one hour of collection than during two and one-half hours.—*J. D. Res.*, 20:627, December 1941.

DAVID S. K. DAI.

Health Index of Teeth

By B. R. EAST and K. POHLEN

FROM a biologic viewpoint, the individual as a whole, and groups of individuals, are of primary interest. In addition, interest is centered in statistics which make a clear distinction between the healthy and the diseased, or between health and some degree of sickness. Certain modifications of the DMF (decayed, missing and filled teeth) method of expression of caries accumulation would bring the statistics of dental health into closer agreement with these principles.

A dental health index presenting the difference between the Klein and Palmer "prevalency rates" and 100 directly expresses the status of dental health, with increase and decrease as the DMF increases or decreases. The health index and the caries attack rates can be directly compared.

The term "biodenture" has been suggested as suitable for statistical purposes to describe the accumulation of the natural teeth in the mouth with the major problems on the metabolic, physiologic and pathologic facts pertaining thereto.—*J. D. Res.*, 20:533, December 1941.

J. E. GILDA.

Emergencies—First Aid

By D. B. PARKER

A NUMBER of first aid measures are available to the average dentist who may not be trained in the basic procedures associated with first aid work, including a general method of diagnosis of common injuries and their immediate treatment in the field. Maintenance of respiration, which is most important, can be assured only if the airways are unobstructed. It may be necessary to institute artificial respiration, for which both the Sylvester and Schaeffer methods can be employed. In cases of respiratory obstruction with asphyxia, tracheotomy may be required. The next consideration is control of hemorrhage by digital pressure, locally or at pressure points, or by tourniquet if necessary. General measures for combating shock should become familiar, with means of immobilizing fractured limbs and technics for movement of injured patients. Bandaging, with especial reference to head injuries, may employ the circular, Gibson, Barton, four-tailed or

Parker traction bandages.—*Am. J. Orthodontics,* **28**:183, April 1942.

J. E. GILDA.

Studies on the Anaerobic Flora of Suppurative Periodontitis

By S. HEMMENS and R. W. HARRISON

STUDY of the bacterial flora of diseased and of normal healthy gingival crevices by means of anaerobic cultures, Giemsa stained smears and dark-field examinations showed that no one micro-organism is specifically associated with suppurative periodontitis. An increased incidence of the fusiform bacillus, the spirochete and *Bact. melaninogenicum* is seen in pus from periodontal pockets as compared with material from normal mouths.

Serial transfers of pus or exudate revealed an association of micro-organisms which produced progressive phlegmonous lesions in guinea-pigs, but not in rabbits, mice or monkeys. Included in this combination, in addition to the three anaerobes mentioned, were several species of facultatively anaerobic cocci, *Vibrio sputigenus* and a filamentous rod. These facultative anaerobes were found commonly in normal mouths as well as in suppurative periodontal lesions.

Attempts to produce experimental periodontitis in monkeys by means of vitamin deficiencies known to produce gingivitis, together with artificial pocket formation, were unsuccessful. The gingival flora of such monkeys was qualitatively similar to that of human periodontal pockets, but a higher incidence of *Bact. melaninogenicum* and the leptotrichia was found in monkey than in human mouths.

From the results of cultural studies and animal inoculation experiments, it is believed that the rôle of bacteria in suppurative periodontitis is that of secondary invaders which may be responsible for the suppurative phase of the disease.—*J. Infect. Dis.,* **70**:131, March-April 1942.

PETER P. DALE.

Malocclusion in the Deciduous Dentition: Serial Study from Birth to Five Years

By J. H. SILLMAN

A HETEROGENEOUS group of forty white children were followed from birth to 5 years with individual impressions of the maxillary and mandibular arches, together with corresponding bites. In addition, periodical medical, surgical and dental histories were recorded. It was concluded that the anterior space between the gum pads at birth has no bearing upon the deciduous dentition. At birth, children have a posterior opening of the jaws ranging from 0 to 8 mm. The mandible must move or grow forward, or both, from 2 to 13 mm. more than the maxillae. It is believed that malocclusion in the permanent dentition can be predicted during this developmental period. Up to the age of 5 years, the type of delivery, method of feeding and mouth breathing do not appear to be factors in malocclusion. The factor of disease needs further investigation. Irregularities of the teeth due to sucking habits were spontaneously corrected soon after the habit was stopped. Heredity seems to be the most important factor in irregularities and malocclusion in the deciduous dentition.—*Am. J. Orthodontics,* **28**:197, April 1942.

J. E. GILDA.

INCIDENTS OF PRACTICE

Cleaning and Keeping Clean Luer and Other Hypodermic Needles

By E. E. and F. J. Svoboda, D.D.S., Cozad, Nebr.

The fine bore of Luer and other needles makes meticulous care a necessity, to assure absolute cleanliness. The repeated forcing of solutions and water through the needle is of value. The small brass wire so often accompanying the needles should not be used, as brass rapidly deteriorates when it comes in contact with an anesthetic solution.

It is surprising to note the amount of residue found in the barrel and hub of a needle when an attempt is made to clean these parts thoroughly. Perhaps this may be the source of a number of minor complications following injection.

The needle should be washed by forcing alcohol followed by distilled water through the barrel. The hub should be cleaned on the inside with cotton tightly rolled and dipped in alcohol. This is repeated until the cotton no longer appears smudged.

It is always well to use a fine wire to clean the inside, but since the wire sold with the needles oxidizes in open air or in contact with moisture during the process of cleaning, we have endeavored to find a wire that would not oxidize. No stainless wire was procurable, but we found that No. 0.011 stainless orthodontia ligature wire about 6 inches in length pulled at both ends at the same time between pliers had great ductility. The broken end is sharp and clear cut and the wire at this point is very thin. Since orthodontia ligature wire is also highly polished, it makes a fine, smooth ramrod that will not mar the inside of the needle.

The same method of cleaning a needle is applied as is used in cleaning a rifle. It is never cleaned from the muzzle end. The precision of the muzzle end of a rifle must not be scratched or scuffed.

Neither must the blade end of a needle be injured, and this is best avoided when it is cleaned from the hub end.

The washings are repeated and the needle is sterilized with steam.

The wire, being soft, can be retained just out of the point during sharpening of the needle point.

Galvanic Action in the Mouth: Report of Case

By Murray N. Rubinstein, D.D.S., New York, N. Y.

A girl, aged 17, on roentgenographic examination, February 27, 1939, showed amalgam fillings with leaky margins and

Deposits on lower cuspid and bicuspids.

secondary decay. The distal aspect of the upper right second bicuspid was carious. Fourteen of the teeth were stained in varying degrees with a silvery deposit, the heaviest on the lower left cuspid and both bicuspids, as shown in the illustration. The deposits, which had been present from twelve to fourteen months, were very thin and tenacious, removal being difficult even with sharp scalers. They were removed with pumice and a Burlew cup under hard pressure, but recurred within eight hours.

The dietary and other habits were in-

vestigated, but gave no clues. The deficient fillings were removed and temporary fillings of zinc oxide and eugenol were placed. The deposits were left untouched, and the patient was dismissed for one week.

Gold inlays were then made, and, within two days, the stains began to disappear. Within a week after the last inlay was cemented to place, the deposits were gone, and without prophylactic treatment.

It is presumed that these stains were the end-result of an acid condition in the mouth which resulted in a galvanic action virtually electroplating the teeth affected. Regular inspection of the teeth every six months has disclosed no return of the deposits.

74 Eighth Avenue.

Dens in Dente

By MORTON A. LORING, D.D.S., Brattleboro, Vt.

A BOY, aged 7, complained that whenever he ate anything, a dog tooth bit his tongue.

Erupted supernumerary tooth.

Examination revealed that his complaint centered about a fully erupted supernumerary tooth, conically shaped and lying lingually from a partially erupted upper right permanent central incisor.

An x-ray film revealed that the tooth was located close to the median suture of the hard palate and was fully rooted—not at all resorbed.

The film also revealed the unusual phenomenon of a twin supernumerary tooth, in an inverted position, in the open root of the partially erupted permanent left central incisor.

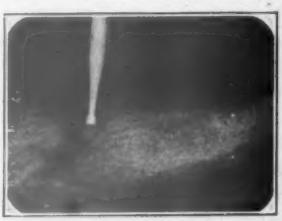
The erupted supernumerary was vital on test and, on extraction, proved to be canine in shape, but without any readily discernible labial or lingual aspect, being cone-shaped with an evenly contoured bulge about the cervical aspect.

Removal of a Root Fragment

By JACK SHOBIN, D.D.S., Baltimore, Md.

A MAN, aged 34, had a lower right bicuspid socket which refused to heal. On pressure, a little pus exuded. An x-ray film revealed an infected root fragment.

The area was anesthetized by infiltration with a 1:25,000 procaine-epinephrine solution, a bold semicircular incision was made with a sharp scalpel, the mucous fold was laid back and the periosteum was pried off gently.



Inverted cone bur inserted in pocket to find root fragment.

Removal of a considerable part of the alveolar bone failed to disclose the root fragment. With a sterilized inverted cone bur inserted in the socket, another x-ray picture was made, which determined the location of the root fragment unmistakably.

The root fragment was removed, and the socket packed with a mixture of sulfathiazole and sulfanilamide powder. The flap was laid back without suturing and sulfathiazole was given by mouth for two days. Healing was rapid and uneventful.

2129 East Monument Street.

QUESTIONS AND ANSWERS

The answers here published have been prepared by authorities, but do not represent the opinion of the American Dental Association as an organization or of any other official bodies unless specifically stated in the reply.

LICHEN PLANUS OF MOUTH

To the Editor: Please let me know if there is any cure for lichen planus of the mouth. What is the treatment for this condition?

M. D., N. Y.

Answer

Lichen planus of the mouth, especially when the lesions are superficial, usually responds to the same type of general therapy as is used in lichen planus elsewhere. Treatment should consist of mental and physical rest and the use of arsenic, which may be given as solution of potassium arsenite (Fowler's solution) in increasing doses, or as the Asiatic pill one-sixteenth to one-thirty-second grain (0.004 to 0.002 gm.) two or three times daily. The patient must be carefully watched for symptoms of arsenical poisoning. Mercury (0.008 to 0.01 gm.), yellow mercurous iodide, one-eighth to one-sixteenth grain may also be used by mouth after each meal or by intramuscular injection in doses of one-eighth to one-fourth grain (0.008 to 0.016 gm.) every other day. Bismuth in oil intramuscularly, 0.2 gm. weekly, is also effective. The patient must be carefully observed for evidence of stomatitis or renal irritation. For patients with subjective sensations, bland mouth washes may be used, and there should be careful attention to mouth hygiene and removal of infected foci. The use of vitamin B complex capsules of high potency is also of value in the treatment of lichen planus. In some cases, especially when hypertrophic papules are present, it may be necessary, in order to secure complete effacement of the papules, to treat them locally by "dotting" with the fine pointed cautery. Roentgen rays in fractional doses (in trained hands) are also of value in the resistant cases.—*J.A.M.A.*, 118:855, March 7, 1942.

BURNING SENSATION WHILE WEARING DENTURES

To the Editor: A patient for whom I have made a full upper vernonite denture complains of a burning sensation throughout the day while wearing the denture. Rinsing the mouth with cold water gives temporary comfort. He also complains of soreness over the complete palatal area upon digital palpation. The tissue of the palate presents a blanched appearance as compared to the alveolar ridges and buccal maxillary tissue. However, no sore areas are visible. I have relieved the nerve ending areas and all hard areas as well. I also tried "corega," thinking the palate might be dry, but no relief was given in any instance. The denture has been worn for about a month. It is processed from vernonite and made by the same technician who has been processing vernonite for me for about three years.

This is the first case of its kind that I have encountered. What possibilities are there regarding the cause of such a condition? What can be done to overcome the trouble?

I have sent the patient for blood sugar, blood, albumin and sugar tests.

Bernard Block, D.D.S.,
6301 Bay Parkway,
Brooklyn, N. Y.

Answer

The condition described might have one or more of three sources. First, and

most likely, is too much pressure over the two posterior palatine foramina and the anterior palatine foramen causing interference with the blood and nerve supply of the palatal area. This may be corrected by extensive fan-shaped relief areas extending from the foramen with from four to six graduated layers of No. 60 tinfoil.

Second, in the processing of any acrylic, there is always some dimensional change. This change may take place in many ways, producing pressure areas where least expected, which, in turn, may produce just such a condition as described. This is especially true when a tooth has been cracked during processing and the case is repaired and a second cure necessitated. This is frequently done in many laboratories.

Third, and least likely, is too much relief over the palatal area due to warpage, or extra heavy relief given intentionally and causing a large negative pressure area or partial vacuum, which nature will not tolerate.

Wherever this burning sensation is present or, for that matter, any other difficulty such as soreness or looseness, it is always well to check the occlusion carefully for perfection in balance.

I. L. F.

DRY MOUTH

To the Editor: A patient for whom I made acrylic dentures complains of having an extremely dry mouth. She does not notice the condition when she removes the dentures. The labial portion is as thin as it can be made and the upper denture is not bulky. The patient is pleased with the denture except for this complaint, which she has been making ever since the dentures were placed, in April 1941, and now I am expected to do something about it.

Have you any suggestions as to the cause or can you refer me to articles written on the subject?

R. P. BELDEN,
Seward, Nebr.

ANSWER

Dry mouth following the insertion of dentures is not necessarily caused by any fault in construction or by the type of material from which they are made. It is a condition which follows in some mouths on insertion of any foreign body in the form of a prosthetic appliance. It is as common after the insertion of gold or vitallium partial dentures as with full dentures. It usually lasts for from three to six months and then gradually disappears. However, in some cases, it has been known to continue for two or three years. There is no specific treatment other than to avoid bulk and undue pressure on areas of blood and nerve supply during construction.

I. L. F.

IS THE DENTAL ASSISTANT ALLOWED TO TAKE ROENTGENOGRAMS?

To the Editor: Is it legal for a dental assistant who has not had technical training other than that received from her employer to take roentgenograms for the dentist?

D. D. S., Pennsylvania.

ANSWER

The state dental practice acts are far from uniform in their provisions concerning roentgenograms. Eight of the state laws appear to provide that the taking of roentgenograms constitutes the practice of dentistry and, therefore, if a dental assistant took x-ray films, she would be practicing dentistry without a license. Four state laws make specific provision for the taking of roentgenograms by unlicensed persons in some cases and only under the dentist's supervision. Twenty-four of the state laws do not mention roentgenograms and apparently the assistant would be permitted to take them. The remainder of the laws are somewhat ambiguous on this question and, in the absence of a court interpretation, it is difficult to classify them in any of the foregoing groups.

S. R. L.

ANNOUNCEMENTS

ANNOUNCEMENTS must be received by the fifth day of the month in order to be published in the forthcoming issue of THE JOURNAL.

CALENDAR OF MEETINGS

AMERICAN ACADEMY OF PERIODONTOLOGY, Boston, Mass., August 20-22.

AMERICAN ACADEMY OF RESTORATIVE DENTISTRY, Boston, Mass., August 22-23.

AMERICAN ASSOCIATION OF DENTAL EDITORS, Boston, Mass., August 22.

AMERICAN COLLEGE OF DENTISTS, Boston, Mass., August 23.

AMERICAN DENTAL ASSISTANTS ASSOCIATION, Boston, Mass., August 24-28.

AMERICAN DENTAL ASSOCIATION, Boston, Mass., August 24-28.

AMERICAN DENTAL HYGIENISTS' ASSOCIATION, Boston, Mass., August 24-28.

AMERICAN FULL DENTURE SOCIETY, Boston, Mass., August 21-23.

AMERICAN SOCIETY FOR THE ADVANCEMENT OF GENERAL ANESTHESIA IN DENTISTRY, New York, October 26.

AMERICAN SOCIETY OF DENTISTRY FOR CHILDREN, Boston, Mass., August 22-25.

AMERICAN SOCIETY OF ORAL SURGEONS AND EXODONTISTS, Boston, Mass., August 20-22.

DENTISTS IN INDUSTRY, Boston, Mass., August.

DISTRICT OF COLUMBIA DENTAL SOCIETY, second and fourth Tuesdays in each month, from October to June at the United States Public Health Service Auditorium, Washington.

UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY ALUMNI ASSOCIATION OUTING, Chicago, Ill., June 10.

MONTREAL (CANADA) DENTAL CLUB FALL DENTAL CLINIC, September 23-25.

NATIONAL DENTAL ASSOCIATION, Nashville, Tenn., August 10-14.

NEW YORK SOCIETY OF ORTHODONTISTS, New York, November 9-10.

ODONTOLOGICAL SOCIETY OF WESTERN PENNSYLVANIA, Pittsburgh, November 3-5.

PACIFIC COAST SOCIETY OF ORTHODONTISTS, San Francisco, Calif., February 22-24, 1943.

WESTERN RESERVE DENTAL ALUMNI ASSOCIATION FIFTIETH ANNIVERSARY CELEBRATION, Cleveland, Ohio, June 8.

WISCONSIN STATE DENTAL ECONOMIC STUDY CLUB, Madison, July 24-25.

STATE SOCIETIES

June

Colorado, at Colorado Springs (18-20)
Idaho, at Lewiston (8-10)
Maine, at Skowhegan, Lakewood (18-20)
New Hampshire, at New London (21-23)
Oregon, at Portland (25-27)
Utah, at Salt Lake City (4-6)
Wyoming, at Laramie (22-24)

September

Southern California, at Los Angeles (14-16)

November

Florida, at Tampa (9-11)
Ohio, at Cincinnati (9-11)

STATE BOARDS OF DENTAL EXAMINERS

Alabama, at Birmingham, June 15. W. A. Wood, Merchants National Bank Bldg., Secretary.

Arizona, at Phoenix, June 29-July 2. R. K. Trueblood, 25 N. Second Ave., Glendale, Secretary.

Arkansas, at Little Rock, June 22-25. Clarence W. Koch, 817 Donaghey Bldg., Little Rock, Secretary.

California, at Los Angeles, June 15. Kenneth I. Nesbitt, 515 Van Ness Ave., San Francisco, Secretary.

Connecticut, at Hartford, June 23-27. Clarence G. Brooks, 302 State St., New London, Recorder.

Delaware, at Wilmington, June 16-19. Charles R. Jefferis, Medical Arts Bldg., Secretary.

Florida, at Jacksonville, June 22-26. H. B. Pattishall, 351 St. James Bldg., Jacksonville, Secretary.

Kentucky, at Louisville, June 9-12. Leon M. Childers, 1312 First Nat'l Bank Bldg., Lexington, Secretary.

Maine, at Augusta, June 22-24. Carl W. Maxfield, 31 Central St., Bangor, Secretary.

Massachusetts, June 15-18. Francis M. Cahill, 413-N State House, Boston, Secretary.

Mississippi, at Jackson, June 16-18. G. L. Clement, Pontotoc, Secretary.

Montana, at Helena, second Monday in July. D. H. McCauley, Laurel, Secretary.

Nebraska, at Lincoln, June 8-13. H. C. Merchant, 1229 Medical Arts Bldg., Omaha, Secretary.

New Jersey, June 29-July 4. W. A. Wilson, 150 East State St., Trenton, Secretary.

New Mexico, at Santa Fe, June 15-18. J. J. Clarke, Artesia, Secretary.

North Carolina, at Raleigh, June 22. Wilbert Jackson, Rich Bldg., Clinton, Secretary.

North Dakota, at Fargo, July 13-16. L. I. Gilbert, 401 Black Bldg., Fargo, Secretary.

Ohio, at Columbus, June 22. Earl D. Lowry, 79 E. State St., Columbus, Secretary.

Oklahoma, at Oklahoma City, June 15-18. W. T. Longwell, First Nat'l Bank Bldg., Frederick, Secretary.

Pennsylvania, at Philadelphia and Pittsburgh, June 16-20. Reuben E. V. Miller, 61 N. Third St., Easton, Secretary.

South Carolina, at Columbia, June 11-13. T. C. Sparks, 1508 Washington St., Columbia, Secretary.

South Dakota, at Sioux Falls, June 21-24. T. E. Burrington, Rapid City, Secretary.

Texas, at Houston, June 15-19. Carl C. Hardin, Jr., 604 Littlefield Bldg., Austin, Secretary.

Vermont, at Montpelier, June 22-24. C. I. Taggart, 139 Bank St., Burlington, Secretary.

Virginia, at Richmond, June 9. John M. Hughes, 715 Medical Arts Bldg., Richmond, Secretary.

West Virginia, at Charleston, June 29-July 2. R. H. Davis, 510 Goff Bldg., Clarksburg, Secretary.

Wisconsin, at Milwaukee, June 1-5. Stephen F. Donovan, Tomah, Secretary.

AMERICAN ACADEMY OF PERIODONTOLOGY

THE twenty-ninth annual meeting of the American Academy of Periodontology will be held at the Copley Plaza Hotel, Boston, August 20-22. Members of the American Dental Association interested in periodontia are invited to attend this program of scientific papers and clinics.

RAYMOND E. JOHNSON, *Secretary,*
824 Lowry Medical Arts Bldg.,
St. Paul, Minn.

AMERICAN ACADEMY OF RESTORATIVE DENTISTRY

THE Fifteenth Annual Meeting of the American Academy of Restorative Dentistry will be held in Boston, Mass., August 22-23, with headquarters at the Copley Plaza Hotel.

W. S. TUCKER, *Secretary,*
940 Canal Bldg.,
New Orleans, La.

AMERICAN ASSOCIATION OF DENTAL EDITORS

THE American Association of Dental Editors will hold its annual meeting in the Statler Hotel, Boston, August 22.

O. W. BRANDHORST, *Secretary,*
4952 Maryland Ave.,
St. Louis, Mo.

AMERICAN COLLEGE OF DENTISTS

THE Boston convocation of the American College of Dentists will be held in the Statler Hotel, August 23, with morning, luncheon, afternoon and evening sessions.

O. W. BRANDHORST, *Secretary,*
4952 Maryland Ave.,
St. Louis, Mo.

AMERICAN DENTAL ASSISTANTS ASSOCIATION

THE eighteenth annual session of the American Dental Assistants Association will be held in Boston, Mass., August 24-28. For further information, address

AILEEN M. FERGUSON,
General Secretary,
709 Centre St.,
Jamaica Plain, Mass.

AMERICAN DENTAL ASSOCIATION

THE Eighty-Fourth Annual Meeting of the American Dental Association will be held in Boston, Mass., August 24-28.

JOHN W. COOKE, *Chairman,*
Publicity Committee,
60 Charlesgate West,
Boston, Mass.

AMERICAN DENTAL HYGIENISTS' ASSOCIATION

THE nineteenth annual meeting of the American Dental Hygienists' Association will be held in Boston, Mass., August 24-28, with headquarters in the Sheraton Hotel.

A. REBEKAH FISK, *Secretary,*
General Dispensary, U. S. Army,
Washington, D. C.

AMERICAN FULL DENTURE SOCIETY

THE American Full Denture Society will hold its fourteenth annual meeting at the Parker House Hotel, Boston, August 21-23.

H. L. HARRIS, *Secretary,*
1353 Lowry Medical Arts Bldg.,
St. Paul, Minn.

AMERICAN SOCIETY FOR THE ADVANCEMENT OF GENERAL ANESTHESIA IN DENTISTRY

THE fall meeting of the American Society for the Advancement of General Anesthesia in Dentistry will be held October 26 at the Midston House, Thirty-Eighth St. and Madison Avenue, New York, at 8:30 p.m. The president, James R. Cameron, of Philadelphia, will preside. Adolph A. Walkling, associate professor of surgery, Jefferson Medical College, Philadelphia, will read a paper on anesthesia best suited for injuries and infections of the head and neck. Tracheotomy procedure will be demonstrated with lantern slides.

M. HILLEL FELDMAN, *Secretary,*
730 Fifth Ave.,
New York.

AMERICAN SOCIETY OF DENTISTRY FOR CHILDREN

THE sixteenth annual meeting of the American Society of Dentistry for Children will be held in Boston, August 22-25, with headquarters at the Hotel Vendome. Members and professional guests are welcome. For additional information, address

R. M. ERWIN, *Secretary,*
613 Corbett Bldg.,
Portland, Ore.

AMERICAN SOCIETY OF ORAL SURGEONS AND EXODONTISTS

THE twenty-fourth annual meeting of the American Society of Oral Surgeons and Exodontists will be held in Boston, Mass., August 20-22, with headquarters in the Copley Plaza Hotel.

HARRY BEAR, *Secretary,*
410 Professional Bldg.,
Richmond, Va.

DENTISTS IN INDUSTRY

A MEETING of dentists interested in industrial hygiene will be held during the annual meeting of the American Dental Association in Boston in August for the purpose of organization. For details, address

R. M. WALLS, *Chairman,*
Committee on Economics,
48 E. Market St.,
Bethlehem, Pa.

UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY ALUMNI ASSOCIATION

THE University of Illinois College of Dentistry Alumni Association outing will be held June 10 at the Medinah Country Club, Chicago.

DONALD L. MCELROY, *President,*
808 S. Wood St.,
Chicago.

MONTREAL DENTAL CLUB

THE Eighteenth Annual Fall Clinic of the Montreal Dental Club will be held September 23-25 at the Mount Royal Hotel.

W. S. SWETNAM, *Secretary,*
1410 Guy St.,
Montreal, Canada.

NATIONAL DENTAL ASSOCIATION

THE National Dental Association will hold its twenty-ninth annual session August 10-14 at the Meharry Dental College, Nashville, Tenn. For further information, address

J. A. JACKSON, *Secretary,*
Charlottesville, Va.

NEW YORK SOCIETY OF ORTHODONTISTS

THE next meeting of the New York Society of Orthodontists will be held at the Waldorf-Astoria Hotel, New York, November 9-10.

NORMAN L. HILLYER, *Secretary,*
Professional Bldg.,
Hempstead.

ODONTOLOGICAL SOCIETY OF WESTERN PENNSYLVANIA

THE Odontological Society of Western Pennsylvania will hold its sixty-first annual fall meeting November 3-5 in the William Penn Hotel, Pittsburgh.

M. H. SMITH, *Office Secretary.*

PACIFIC COAST SOCIETY OF ORTHODONTISTS

THE next meeting of the Pacific Coast Society of Orthodontists will be held in San Francisco February 22-24, 1943.

EARL F. LUSSIER, *Secretary,*
450 Sutter Bldg.,
San Francisco.

WESTERN RESERVE DENTAL ALUMNI ASSOCIATION

THE Western Reserve Dental Alumni Association announces the Fiftieth Anniversary Celebration, June 8. The alumni clinic, class reunions and dinner will be held at the Mid Day Club.

JOSEPH R. GOULD, *Secretary,*
630 Rose Bldg.,
Cleveland, Ohio.

WISCONSIN STATE DENTAL ECONOMIC STUDY CLUB

THE twelfth annual meeting of the Wisconsin State Dental Economic Study Club will be held at the Hotel Loraine, Madison, July 24-25. Dentists and their wives, dental assistants and guests are invited. Dentists must present A.D.A. membership cards. For additional information, address

NORMAN C. JOHNSON, *Secretary,*
905 University Ave.,
Madison.

SOUTHERN CALIFORNIA STATE DENTAL ASSOCIATION

THE next annual meeting of the Southern California State Dental Association will be held at the Los Angeles Biltmore Hotel, September 14-16.

ROBERT L. BORLAND, *Secretary,*
602 Chapman Bldg.,
Los Angeles.

COLORADO STATE DENTAL ASSOCIATION

THE next annual meeting of the Colorado State Dental Association will be held at the Broadmoor, Colorado Springs, June 18-20.

C. K. PHILLIPS, *Secretary,*
529 Majestic Bldg.,
Denver.

FLORIDA STATE DENTAL SOCIETY

THE next annual meeting of the Florida State Dental Society will be held at Tampa, November 9-11.

W. P. WOOD, JR., *Secretary,*
442 W. Lafayette St.,
Tampa.

IDAHO STATE DENTAL ASSOCIATION

THE next annual meeting of the Idaho State Dental Association will be held June 8-10 at Lewiston.

REX W. BARSTOW, *Secretary,*
Moscow.

MAINE DENTAL SOCIETY

THE next annual meeting of the Maine Dental Society will be held at Skowhegan, Lakewood, June 18-20.

EDWARD J. FITZGERALD, *Secretary,*
Boothbay Harbor.

NEW HAMPSHIRE DENTAL SOCIETY

THE next annual meeting of the New Hampshire Dental Society will be held at the Soo Nipi Park Lodge, New London, June 21-23.

FLOYD E. WILLIAMS, *Secretary,*
814 Elm St.,
Manchester.

OHIO STATE DENTAL SOCIETY

THE next annual meeting of the Ohio State Dental Society will be held at the Netherland-Plaza Hotel, Cincinnati, November 9-11.

EDWARD C. MILLS, *Secretary,*
255 E. Broad St.,
Columbus.

OREGON STATE DENTAL ASSOCIATION

THE next annual meeting of the Oregon State Dental Association will be held at Portland, June 25-27.

F. W. HOLLISTER, *Secretary,*
Selling Bldg.,
Portland.

UTAH STATE DENTAL ASSOCIATION

THE Utah State Dental Association will hold its next annual meeting at the Newhouse Hotel, Salt Lake City, June 4-6.

S. KENNETH ROBINS, *Secretary,*
Medical Arts Bldg.,
Salt Lake City.

WYOMING STATE DENTAL ASSOCIATION

THE next annual meeting of the Wyoming State Dental Association will be held in Laramie, June 22-24.

J. D. MCNIFF, *Secretary,*
Laramie.

ALABAMA BOARD OF DENTAL EXAMINERS

THE Board of Dental Examiners of Alabama will conduct its next annual dental examination beginning June 15 at Birmingham. All credentials must be filed with the secretary at least two weeks in advance of the examination. Address all correspondence to

W. A. WOOD, *Secretary,*
Merchants National Bank Bldg.,
Mobile.

ARIZONA STATE DENTAL BOARD

THE Arizona State Dental Board will hold its annual examination of applicants for license to practice dentistry in Arizona, at Phoenix, June 29-July 2. All application blanks and fees must be in the hands of the secretary at least fifteen days prior to the date of the examination. For application blanks and other information, address

R. K. TRUEBLOOD, *Secretary,*
25 N. 2nd Ave.,
Glendale.

ARKANSAS STATE BOARD OF DENTAL EXAMINERS

THE Arkansas State Board of Dental Examiners will conduct the next examination of applicants for dental licensure at Little Rock, June 22-25. All applications must be filed not later than June 10.

CLARENCE W. KOCH, *Secretary,*
817 Donaghey Bldg.,
Little Rock.

STATE OF CALIFORNIA BOARD OF DENTAL EXAMINERS

THE next examination to be conducted by the Board of Dental Examiners of California for license to practice dentistry or dental hygiene in the State of California will be held in Los Angeles, in the University of Southern California, College of Dentistry, commencing June 15. All credentials must be in the office of the secretary at least twenty days prior to the examinations. Address all communications to

KENNETH I. NESBITT, *Secretary,*
Room 203, 515 Van Ness Ave.,
San Francisco.

CONNECTICUT DENTAL COMMISSION

THE Connecticut Dental Commission will meet in Hartford, June 23-27, for the examination of applicants for license to practice dentistry and dental hygiene and to transact any other business to come before it. Applications should be in the hands of the recorder at least ten days before the meeting. For application blanks, apply to

CLARENCE G. BROOKS, *Recorder,*
302 State St.,
New London.

DELAWARE STATE BOARD OF DENTAL EXAMINERS

THE next examination of the Delaware State Board of Dental Examiners will be held June 16-19, at the Delaware Hospital, Wilmington, at 9 a.m.

CHARLES R. JEFFERIS, *Secretary,*
Medical Arts Bldg.,
Wilmington.

FLORIDA STATE BOARD OF DENTAL EXAMINERS

THE Florida State Board of Dental Examiners will hold its annual examination of applicants for license to practice dentistry or dental hygiene, at the Seminole Hotel, Jacksonville, June 22-26. Dental candidates must file preliminary applications by April 22. Final applications of dental and dental hygiene candidates must be complete by May 2. Address all communications to

H. B. PATTISHALL, *Secretary,*
351 St. James Bldg.,
Jacksonville.

KENTUCKY STATE BOARD OF DENTAL EXAMINERS

THE next meeting of the Kentucky State Board of Dental Examiners will be held June 9-12 at the University of Louisville Dental School, Louisville. Dentists having graduated prior to 1942 and desiring to stand examination before this board must file applications, complete with full information requested, in this office not later than March 9. Applications of 1942 graduates must be in the secretary's office by May 9. Ample time should be allowed for securing all data required. For application forms and further information, apply to

LEON M. CHILDERS, *Secretary,*
1312 First Nat'l Bank Bldg.,
Lexington, Ky.

MAINE STATE BOARD OF DENTAL EXAMINERS

THE next meeting of the Maine State Board of Dental Examiners will be held June 22-24 at the State House, Augusta. Applications with the necessary fee must be in the hands of the secretary at least ten days prior to the date of the examination. Address all communications to

CARL W. MAXFIELD, *Secretary,*
31 Central St.,
Bangor.

MASSACHUSETTS BOARD OF DENTAL EXAMINERS

THE Massachusetts Board of Dental Examiners will hold its next annual examination June 15-18. All credentials must be filed with the secretary at least thirty days in advance. For further information, address

FRANCIS M. CAHILL, *Secretary,*
413-N State House,
Boston.

MISSISSIPPI STATE BOARD OF DENTAL EXAMINERS

THE Mississippi State Board of Dental Examiners will hold its annual examination of applicants for license to practice dentistry or dental hygiene at the state capitol, Jackson, June 16-18. Address communications to

G. L. CLEMENT, *Secretary,*
Pontotoc.

MONTANA STATE BOARD OF DENTAL EXAMINERS

A MEETING of the Montana State Board of Dental Examiners will be held in Helena on the second Monday in July. All applications for examinations must be in the hands of the secretary not later than twenty days previous to the opening of the examination and must be sworn to before a notary public.

D. H. MCCAULEY, *Secretary,*
Laurel.

NEBRASKA BOARD OF DENTAL EXAMINERS

THE next regular meeting of the Nebraska State Board of Dental Examiners will be held June 8-13 at the University of Nebraska Dental School, Lincoln.

H. C. MERCHANT, *Secretary,*
1229 Medical Arts Bldg.,
Omaha.

STATE BOARD OF REGISTRATION AND EXAMINATION IN DENTISTRY OF NEW JERSEY

THE State Board of Registration and Examination in Dentistry of New Jersey will hold its annual examinations commencing Monday, June 29 and continuing for five days thereafter. On application to the secretary, a copy of the requirements and rules for applicants, instruction sheet and preliminary application blank will be sent. Any person desiring to become a candidate must file the preliminary application, together with the examination fee of $25, on or before March 15 for the succeeding June examinations or before September 1 for the succeeding December examinations.

W. A. WILSON, *Secretary,*
150 East State St.,
Trenton.

NEW MEXICO BOARD OF DENTAL EXAMINERS

THE New Mexico State Board of Dental Examiners will hold its next examination June 15-18 at Santa Fe.

J. J. CLARKE, *Secretary,*
Artesia.

NORTH CAROLINA STATE BOARD OF DENTAL EXAMINERS

THE next annual meeting of the North

Carolina State Board of Dental Examiners for the examination of applicants for licensure will be held at the State Capitol, Raleigh, beginning June 22. Applications must be filed with the secretary thirty days before the examination. For application blanks and further information, address

WILBERT JACKSON, *Secretary,*
Rich Bldg.,
Clinton.

NORTH DAKOTA STATE BOARD OF DENTAL EXAMINERS

THE North Dakota State Board of Dental Examiners will hold its next examination in the Gardner Hotel, Fargo, July 13-16. For further information and application blank, address

L. I. GILBERT, *Secretary,*
401 Black Bldg.,
Fargo.

OHIO STATE DENTAL BOARD

THE next examination of the Ohio State Dental Board will be held at Ohio State University, College of Dentistry, Columbus, the week beginning June 22. All applications must be in the hands of the secretary at least ten days before the examination. For further information, address

EARL D. LOWRY, *Secretary,*
79 E. State St.,
Columbus.

STATE OF OKLAHOMA BOARD OF GOVERNORS OF REGISTERED DENTISTS

THE Board of Governors of Registered Dentists of the State of Oklahoma will hold its next examination in Oklahoma City, June 15-18. Final application for examinations in dentistry, dental hygiene and dental specialties must be complete by June 10.

W. T. LONGWELL, *Secretary,*
First National Bank Bldg.,
Frederick.

DENTAL COUNCIL AND EXAMINING BOARD OF THE COMMONWEALTH OF PENNSYLVANIA

THE Dental Council and Examining Board of the Commonwealth of Pennsylvania will conduct examinations in Philadelphia and Pittsburgh, June 16-20. For further information and application blanks, address the Department of Public Instruction, Bureau of Professional Licensing, Dental Division, Harrisburg.

REUBEN E. V. MILLER, *Secretary,*
61 N. 3rd St.,
Easton.

SOUTH CAROLINA STATE BOARD OF DENTAL EXAMINERS

THE South Carolina State Board of Dental Examiners will hold its next annual meeting at Columbia, June 11-13.

T. C. SPARKS, *Secretary,*
1508 Washington St.,
Columbia.

SOUTH DAKOTA STATE BOARD OF DENTAL EXAMINERS

A MEETING of the South Dakota State Board of Dental Examiners will be held at the Carpenter Hotel, Sioux Falls, June 21-24. For further information or application forms, address

T. E. BURRINGTON, *Secretary,*
Rapid City.

TEXAS STATE BOARD OF DENTAL EXAMINERS

THE Texas State Board of Dental Examiners will hold an examination June 15-19 at Houston, at the Rice Hotel. For further information and application blanks, address

CARL C. HARDIN, JR.,
604 Littlefield Bldg.,
Austin.

VERMONT STATE BOARD OF DENTAL EXAMINERS

THE Vermont State Board of Dental Examiners will meet June 22-24 in the State House, Montpelier, to examine applicants for license to practice dentistry and dental hygiene. All applications, together with examination fee, must be in the hands of the secretary at least fifteen days before the date of the meeting. For applications and other information, address

C. I. TAGGART, *Secretary,*
139 Bank St.,
Burlington.

VIRGINIA STATE BOARD OF DENTAL EXAMINERS

THE next regular meeting of the Virginia State Board of Dental Examiners will be held at the Medical College of Virginia, Richmond, beginning at 9 a.m., June 9. Applicants are required to present a certificate from the Virginia State Board of Education showing that they have had one year of academic education equal to one year of college work. They must be graduates of a class A dental college or university and must be prepared to do any kind of practical or operative work necessary in the general practice of dentistry. Theoretical examination covers subjects usually found in a complete dental curriculum. Applications, with fee and photograph, must be filed fifteen days before the examination, June 9. For application blanks and further information, apply to

JOHN M. HUGHES, *Secretary,*
715 Medical Arts Bldg.,
Richmond.

WEST VIRGINIA STATE BOARD OF DENTAL EXAMINERS

THE West Virginia State Board of Dental Examiners will hold its next examination for those desiring a license to practice dentistry or dental hygiene, at Charleston, June 29-July 2. For further information, address

R. H. DAVIS, *Secretary,*
510 Goff Bldg.,
Clarksburg.

STATE OF WISCONSIN BOARD OF DENTAL EXAMINERS

THE State of Wisconsin Board of Examiners will hold its next examination at Marquette Dental School, Milwaukee, June 1-5. Examinations will be given for licensure of dentists and hygienists. All applications must be in by May 26. For application blanks and information, address

STEPHEN F. DONOVAN, *Secretary,*
Tomah.

EXAMINATION FOR APPOINTMENT IN THE DENTAL CORPS OF THE NAVY

THE next examination for appointment as assistant dental surgeon, U. S. Navy (lieutenant [junior grade], Dental Corps, U. S. Navy) will be held at the Naval Training Station, Norfolk, Va., the Naval Training Station, Great Lakes, Ill., the Naval Training Station, San Diego, Calif., and the Naval Dental School, National Naval Medical Center, Bethesda, Md., July 6. Applications for this examination should be made to the Chief of the Bureau of Medicine and Surgery, Navy Department, Washington, D. C.

Applicants for appointment as assistant dental surgeon must be citizens of the United States, more than 21 but less than 32 years of age at the time of acceptance of appointment, and graduates of a class A dental school.

A circular of information listing physical and other requirements for appointment, subjects in which applicants are examined and other data pertaining to salary, allowances, etc., can be obtained from the Bureau of Medicine and Surgery, Navy Department, Washington, D. C., on request.

LOCATIONS FOR DENTISTS

A NEED for additional dentists exists in many of the vital defense areas. These shortages have arisen because of the great increase in civilian population that has occurred during the year. At present, needs exist in a number of states in communities varying in size from small villages to large cities. A continuing increase in population will result in overtaxing the dental personnel in many other localities where at present the dentists are very near the limit of their capacities. In many of these defense areas, there are defense housing projects in which office space or living accommodations, or both, may be secured. The United States Public Health Service in cooperation with the Division of Defense Housing of the Federal Works Agency, which supervises these projects, is interested in acquainting dentists with the needs of these communities. If you are interested in securing more specific information about localities for the establishment of practice, communicate with

THOMAS PARRAN, *Surgeon General.*

DENTAL RESIDENCIES AND INTERNSHIPS

THOSE interested in obtaining applications for the dental residencies and dental internships at the Sea View Hospital for the fiscal year commencing July 1 can obtain information from Jerome Leon, assistant

medical director of the hospital, Staten Island, New York. Dental residencies offer an annual stipend of $1,200 and complete maintenance. Dental internships offer $15 monthly and complete maintenance. Sea View Hospital is the largest tuberculosis hospital in the world and offers exceptional facilities in the various phases of dentistry.

RALPH HOWARD BRODSKY, *Director,*
Division of Oral Surgery,
Sea View Hospital.

DENTAL RESIDENCY

THE University of Oregon Medical School Hospitals and Clinics offers a residency in dental medicine and oral surgery, the period of service to be one year, with compensation $40 monthly, in addition to board, room and laundry. The division is under the general direction of the department of medicine and the direct supervision of the head of the division and a visiting staff of sixteen dentists. Service is carried on in the outpatient clinic and the three hospitals. Application blanks will be furnished on request. Direct inquiries to

RICHARD B. DILLEHUNT, *Dean,*
University of Oregon Medical School,
Portland.

DENTAL RESIDENTSHIP

A TWELVE months' dental residentship is available at the Western Pennsylvania Hospital, Pittsburgh, beginning July 1. The applicant for this position must be a graduate dentist holding a Pennsylvania license and having had the minimum of one year's dental internship in a recognized hospital. A salary of $83.33 per month with maintenance is offered with the position.

J. A. GARDNER, *Chief,*
Dental Department.

RESEARCH FELLOWSHIP IN MEDICINE AND DENTISTRY AT THE UNIVERSITY OF ILLINOIS

THE Graduate School of the University of Illinois has established four research fellowships to be awarded for one year in the fields of medicine and dentistry in Chicago at a stipend of $1,200 per year (calendar year with one month's vacation). Candidates for these fellowships must have completed a training of not less than eight years beyond high school graduation. This training may have been acquired in any one of the following ways, or the equivalent thereof: 1. Work leading to the B.S. and M.D. degrees. 2. Work leading to the B.S., M.S., and D.D.S. degrees. 3. Work leading to the B.S. and B.A. degrees in a four-year collegiate course and to the D.D.S. degree. 4. Work leading to the B.S., D.D.S. and M.D. degrees. The fellowship year begins September 1. Formal application blanks can be secured from the Secretary of the Committee on Graduate Work in Medicine and Dentistry, 1853 W. Polk St., Chicago, Ill.

BRONX HOSPITAL VOLUNTEERSHIPS

THE Dental Department of the Bronx Hospital offers a number of volunteerships to recent graduates in dentistry in the following branches: oral surgery and anesthesia; surgical pyorrhea; orthodontia; root canal therapy, and operative dentistry. Those offering satisfactory credentials indicating their interest in the clinical study of dental surgery as a health problem will receive consideration. Address applications to the Dental Department, Bronx Hospital, Fulton Ave. at 169th St., Bronx, New York. Appointments will begin in July.

DAVID WURZEL, *Director,*
Dental Department.

INTERNSHIP APPOINTMENTS

THE Walter G. Zoller Memorial Dental Clinic, University of Chicago, offers four rotating internship appointments, effective July 1, 1942, to June 30, 1943. The clinic maintains four divisions of service: 1. The Zoller Clinic in Billings Hospital for general dental service. 2. The University Dental Clinic in Billings Hospital for diagnosis and minor oral surgery. 3. The Prenatal Dental Clinic in Chicago Lying-In Hospital for general service. 4. The Orthopedic Dental Clinic in the Home for Destitute Crippled Children for general dentistry. In addition to clinical practice, the intern will assist in the department of anesthesia and have the privilege of attending all departmental seminars on dentistry, medicine, pathology, etc. Those seniors interested should write immediately for application blanks to the Director, Walter G. Zoller Memorial Dental Clinic, University of Chicago, Chicago.

CARNEGIE FELLOWSHIPS FOR RESEARCH AND GRADUATE WORK IN THE DENTAL SCIENCES

AIDED by the Carnegie Corporation, the School of Medicine and Dentistry of the University of Rochester offers scholarships paying $1,200-$1,800 per annum to well-trained dental graduates who are interested in research or who desire special training in the basic medical sciences as an aid to dental teaching or practice. A few fellowships also offer part-time training in oral surgery. On appointment, the applicant is given the title of Carnegie Dental Fellow and, according to his interest, works as a graduate student in one of the departments of the medical schools. Here, excellent laboratory facilities, adequate direction and close contact with various investigations related to medicine and dentistry help his research and study. Fellows are encouraged to attend medical classes, seminars and staff meetings and, when opportunity presents itself, to participate in class instruction and scientific meetings. Contact with the problems of clinical dentistry may be maintained through the Oral Surgery Clinic of the Strong Memorial Hospital and the Rochester Dental Dispensary. With the approval of the Graduate Council of the university, Fellows may prepare themselves for the degree of M.S. or Ph.D. Applications should be made to

GEORGE H. WHIPPLE, *Dean,*
School of Medicine and Dentistry,
Rochester, N. Y.

POSTGRADUATE COURSE IN PERIODONTIA

THE New York University College of Dentistry will hold its ninth annual postgraduate course in periodontia for twenty sessions, as follows: Schedule A, morning and afternoon sessions, June 15-26. Schedule B, morning and afternoon sessions, June 15-17; mornings only, June 18-July 8. Fee $100. Course limited to fifteen men. Preference given in order of receipt of application. The course will include etiology, diagnosis and treatment of periodontal disease; various technics of pocket eradication, with conservative treatment stressed; Vincent's infection; diagnosis of types of bone resorption; mouth manifestations of systemic disease; periodontal foci of infection; toothbrushing; instrumentation, diet; balancing of occlusion; taught by lectures and clinical work, each student treating several cases. Instruction by Samuel Charles Miller, Sidney Sorrin, J. Lewis Blass and the entire periodontia faculty. For further information and application, address the Office of the Dean, New York University College of Dentistry, 209 E. 23rd St., New York, N. Y.

POSTGRADUATE COURSES, COLLEGE OF DENTISTRY, OHIO STATE UNIVERSITY

THE College of Dentistry of Ohio State University, Columbus, offers postgraduate courses in dentistry that are especially designed for the general practitioner who may wish to amplify his training in any of the following fields: x-ray technic and diagnosis (course offered June 8-12); crown and bridge work (June 15-20); oral surgery (June 15-19); prosthodontia (June 15-20); operative dentistry (June 15-19), and root canal therapy (June 15-19). Periodontia will be offered one day per week for ten consecutive weeks beginning June 17. The fee for these courses is $50. A postgraduate course in orthodontics is offered on a part-time basis. The fee and length of course is determined by the scope of the student's fundamental undergraduate training in this subject. Registration in all courses is limited to ten men. It is the aim of these courses to teach new technics as well as to review fundamentals. For further information and application blanks, address the Dean, College of Dentistry, Ohio State University, Columbus, Ohio.

COLUMBIA UNIVERSITY SCHOOL OF DENTAL AND ORAL SURGERY REFRESHER COURSES

COLUMBIA University School of Dental and Oral Surgery offers a short course in periodontia for qualified graduates in dentistry September 18, 1942, to January 15, 1943.

A ten-day intensive course will include lectures, discussions, demonstrations and clinical practice. An extended course, one half day per week for two sessions, will include lectures, discussions and supervised technical treatment. Both courses will be conducted by Frank E. Beube, Isador Hirschfeld, Harold J. Leonard (executive officer) and Arthur H. Merritt.

The courses given at the School of Dental and Oral Surgery, Columbia University, are designed to be "refresher" courses; i.e., to bring practitioners abreast of modern undergraduate teaching in theory and practice in the subject. Admission to the course is limited to qualified graduates in dentistry who are members in good standing of the American Dental Association or recognized sectional organizations. In the case of foreign applicants, membership in the applicant's national dental organization is required.

Information can be obtained from the registrar, School of Dental and Oral Surgery, 630 West 168th Street, New York, N. Y.

SUMMARY OF LITERATURE ON PERIODONTAL DISEASE

THE Periodontia Department of New York University College of Dentistry cordially invites each investigator in the field of periodontal disease who has published a paper or papers containing the results of either laboratory research or clinical observations which bear directly or indirectly upon the etiology or treatment of periodontal disease in man or animals (1) to submit a concise summary of those of his papers which he deems to be his basic contributions to this field and which he considers to be in agreement with his present thinking, or with his experience and thinking up to a time specified by him; (2) to cite the location and time of appearance of the paper or papers which contain such basic findings, and (3) to enclose any additional statement that may seem necessary to him to amend the foregoing statements so that they more accurately reflect his present opinions.

These summaries will, therefore, contain only present opinions, rather than the total results of each worker's endeavors, which may, in addition, include errors, duplication, altering viewpoints, etc. The compilations of such summaries, which will contain the essence of each investigator's present thinking, will then be published in book form and will, therefore, not be a series of abstracts of papers on either the etiology or the treatment of periodontal disease.

The summary should be in our hands not later than July 1, 1942.

New York University, College of Dentistry,
209 East 23rd St.,
New York, N. Y.

UNITED STATES PATENTS APPLICABLE OR PERTAINING TO DENTISTRY ISSUED DURING APRIL 1942

April 7

2,278,890, ADAM J. MAY. Dental chair and the like.

2,279,067, MAX S. SHAPIRO. Synthetic porcelain for making artificial teeth and dental restorations.

April 14

2,279,351, CLAWSON N. SKINNER. Partial denture.

2,279,355, HARVEY L. WILENSKY. Tooth cleaning and gum massaging brush.

2,279,687, CHARLES G. KERR. Toothbrush.

2,279,763, CECIL SPENCER SIVIL. Alloy.

2,279,952, WALTER J. PRYOR. Denture mold.

2,279,982, HENRY L. GLYNN. Rotary toothbrush.

April 21

2,280,402, ERNEST H. GREPPIN. Dental operating lamp.

April 28

2,280,927, DAVID W. PHILLIPS. Means and apparatus for preparing inlay cavities.

2,281,528, HERBERT R. BERGER. Method of heating and melting precious metals and flux, composition therefor.

D-132, 210, HENRY DREYFUSS. Design for an adjustable chair casing.

IF you want answers to dental questions—

IF you want to improve your practice—

IF you want to hear about recent developments—

IF you want to see the latest technics—

IF you want to learn of advances in materials—

IF you want to see new improvements in equipment—

IF you want to meet old friends and acquaintances—

Come to

BOSTON

August 24-28

AMPLE FLOSS SUPPLY ASSURED

J & J HAS SILK SUBSTITUTE

● Our Research Laboratory has evolved a synthetic fibre dental floss to replace silk. It has all the qualities of silk. You will notice no difference. We will no longer use silk. We expect no shortage of dental floss.

DENTAL DIVISION

Johnson & Johnson

NEW BRUNSWICK, N. J. CHICAGO, ILL.

Successful operations call for CONFIDENCE in EQUIPMENT

BACK of every successful military operation there must be *confidence*. Confidence in the cause. Confidence in men. Above all else, *confidence in equipment* — complete trust that it will serve its promised purpose.

Dental operations are not far different. In employing local anesthesia to control pain, you can go ahead unhampered by personal tension or patients' fears only when you know the solution you use is worthy of your trust. Novocain with Cobefrin has proved its trustworthiness in more than 100 million injections.

It is dependable, uniform and free from disturbing side effects. Specify Novocain with Cobefrin, either Cook or Waite, on your next order and prove its day-to-day dependability for pain control for yourself.

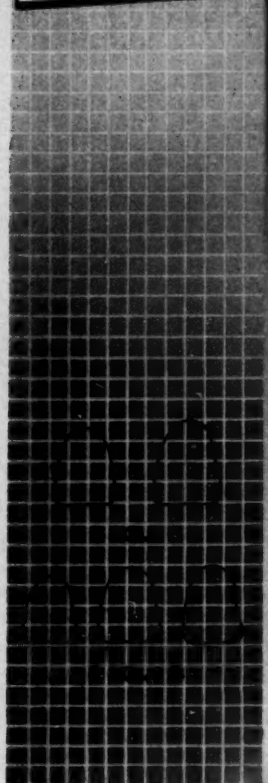
COOK LABORATORIES, INC. • THE ANTIDOLOR MFG. CO., INC.
170 Varick Street New York, N. Y.
Laboratories: Rensselaer & Springville, N. Y.

NOVOCAIN, COBEFRIN: Reg. Trademarks

NOVOCAIN WITH COBEFRIN

Over 100 million injections made with solutions containing Cobefrin

At last, tooth numbering means something



CORONAL INDEX AND

VERI-CHROME FIVE PHASE ANTERIORS

The coronal index expresses the ratio between the width and length of the central incisor crown. It is an expression of form, not size.

A group of central incisors may have the same coronal index (width-length ratio), but have different absolute sizes. (Fig. A)

Also, a group of central incisors may all have the same width but different coronal indices. (Fig. B)

The natural range of coronal indices is adequately covered by the three modal groups: 75-85-95. These are referred to as Long, Medium and Short.

In last month's ad we developed the first factor of the Coordinate Size System, the widths of sets of 6s: 39mm., 42mm., 45mm., 48mm.

The second factor is the coronal index which completes the Coordinate Size System and identifies the mold. To illustrate: M42 is a medium length mold measuring 42mm.

The twelve size boxes of this Coordinate System for Veri-Chrome Five Phase Anteriors cover 98% of all prosthetic needs.

UNIVERSAL'S COORDINATE SIZE SYSTEM

For Veri-Chrome Five Phase Anteriors

simplifies selection and eliminates duplication.

	39 MM	42 MM	45 MM	48 MM
CORONAL INDEX 75 LONG	L 39	L 42	L 45	L 48
CORONAL INDEX 85 MEDIUM	M 39	M 42	M 45	M 48
CORONAL INDEX 95 SHORT	S 39	S 42	S 45	S 48

UNIVERSAL DENTAL COMPANY

Manufacturers of the Most Complete Line of Porcelain Teeth

48th & Brown Sts. Philadelphia, Pa. U.S.A.

Top—A complete Ritter operating room with Model "E" Unit. Center—With the exclusive "split" (or Model "F") Unit. Lower—With the Model "B" Tri-Dent.

MODERNIZE TODAY

While It Is Still Possible

With dental incomes growing daily . . . with more strain being put on dentists because of long hours . . . now is the time to modernize with new, efficient Ritter equipment.

Modernization means greater production in your office . . . it means new ease of operation . . . it creates a far more favorable impression on your patients.

If you are not using up-to-date Ritter equipment you are paying for it in loss of time and earnings. We can help you stop those losses . . . and increase your income.

You can pay for your investment in modern Ritter duplex operating rooms by making them pay for themselves, as you use new Ritter equipment. Make sure you retain those new patients who are coming to you today . . . tomorrow may be too late.

FREE **A Ritter booklet "Add 20% to Your Income" . . . write for it . . . or ask your Ritter dealer.**

Ritter

BUILT UP TO A STANDARD — NOT DOWN TO A PRICE

PURE AND UNIFORM

SPECIALLY PREPARED FOR ORAL USE

The high standards of purity and uniformity of Merck Sodium Perborate Flavored are constantly maintained by rigid tests in the Merck Control Laboratory prior to release for packaging and distribution.

Other outstanding qualities of Merck Sodium Perborate Flavored:

- ★ **A natural white powder**
- ★ **Finely screened for rapid solubility**
- ★ **Contains no abrasives**
- ★ **Alkaline in its reaction**
- ★ **Council Accepted**

Antiseptic, bactericidal, deodorizing

ACCEPTED AMERICAN DENTAL ASSOCIATION

Literature on request

MERCK & CO. Inc. *Manufacturing Chemists* **RAHWAY, N. J.**

FOR VICTORY—Buy War Savings Bonds and Stamps

The Society Woman may be a fine interior decorator, BUT...

the dentist is better qualified to judge and recommend dental products. That's why the makers of Pycopé Tooth Powder and Pycopé Tooth Brushes never advertise to the public. Your patients appreciate—and value more highly—your recommendation of products that are not ballyhooed through mass advertising. Remember—the only way your patients hear about Pycopé is through you.

PYCOPÉ

PY-KO-PAY

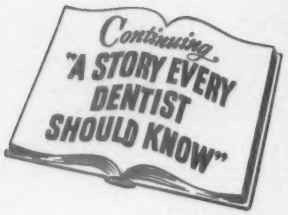
TOOTH POWDER AND TOOTH BRUSHES

Acids

YOUR PATIENTS can enjoy food with high acid content . . . can smoke . . . can take medicines with the certain knowledge that dilute acids will not harm their dentures made of "Lucitone" methyl methacrylate denture resin.

"Lucitone" meets the acid test—literally. It has withstood, at the Du Pont plastics laboratory, severe conditions such as prolonged exposure to acids more powerful than those in the mouth. These tests—and the experience of thousands of dentists—show that "Lucitone" color won't leach and that continued use won't pit its hard, smooth surface. They prove that

"Lucitone" is certified to comply with the specifications of the American Dental Association.

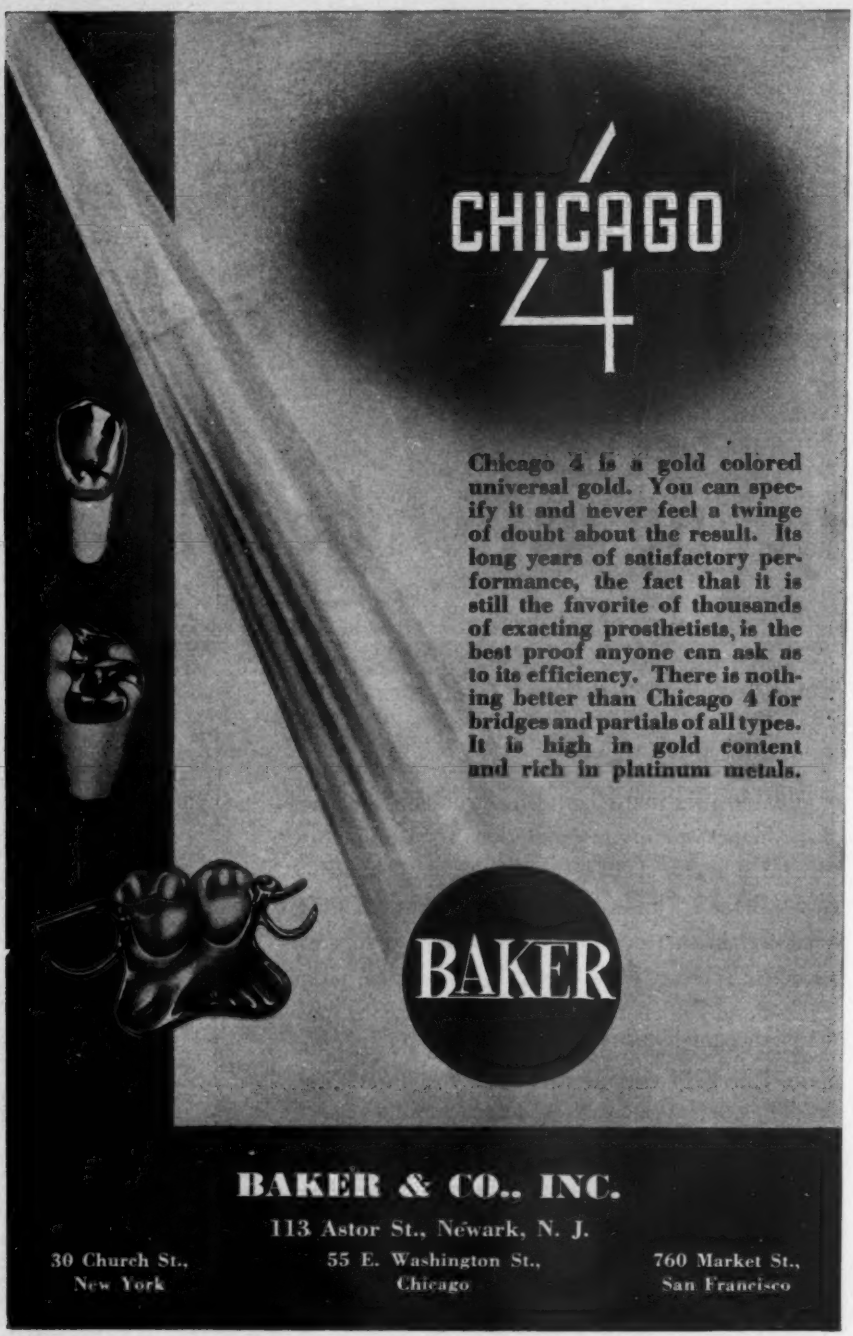


get no action here !

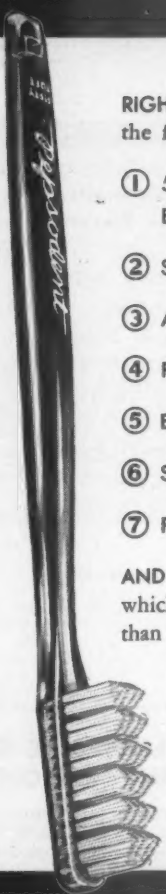
dentures made of "Lucitone" retain their lifelike beauty.

Special precautions assure that "Lucitone" is free of all impurities that might cause trouble. It is made of the highest quality raw materials. Its manufacture is guarded by dozens of tests and automatic controls. The skill and "know-how" of Du Pont chemists make certain that every batch matches the formula perfected by years of research. For your own peace of mind and your patients' fullest satisfaction, specify "Lucitone" for every job. E. I. du Pont de Nemours & Co. (Inc.), Plastics Department, Arlington, N. J.

"Lucitone" denture resin is the only methyl methacrylate resin denture material made by Du Pont. "Lucitone" is distributed solely by The L. D. Caulk Company, Milford, Delaware.


CHICAGO 4
Chicago 4 is a gold colored universal gold. You can specify it and never feel a twinge of doubt about the result. Its long years of satisfactory performance, the fact that it is still the favorite of thousands of exacting prosthetists, is the best proof anyone can ask as to its efficiency. There is nothing better than Chicago 4 for bridges and partials of all types. It is high in gold content and rich in platinum metals.
BAKER
BAKER & CO., INC.
113 Astor St., Newark, N. J.
30 Church St., New York
55 E. Washington St., Chicago
760 Market St., San Francisco

8 Reasons why Dentists recommend the NEW, IMPROVED PEPSODENT "50-TUFT" TOOTH BRUSH!



RIGHT FROM THE START, these special features have caught the fancy of dentists all over the country:

① 50 TUFTS, TWICE AS MANY AS ANY OTHER BRUSH IN A SMALL, COMPACT HEAD

② SYNTHETIC FIBERS WHICH RESIST SOGGINESS

③ AMPLE CLEANSING SURFACE

④ PATENTED CONSTRUCTION

⑤ EASY-TO-GRIP HANDLE

⑥ SCIENTIFIC DESIGN

⑦ PATENTED TUFTING

AND... to all this we have added a grand, new improvement which gives the Pepsodent "50-Tuft" Brush greater efficiency than ever before:

⑧ STURDIER, MORE DURABLE NYLON BRISTLES FOR DOUBLE-POWER CLEANSING

More and more dentists every day are recommending the Pepsodent "50-Tuft" Tooth Brush...get acquainted with it *yourself*—today!

THE PEPSODENT COMPANY

S. S. WHITE WAXES

PINK BASE-PLATE NO. 9

A light pink laboratory wax—pleasing for try-ins. Remains rigid in high temperature climates. Excellent working qualities.

Sheets .054" x 2 15/16" x 5½"

1 lb. (½ lb. boxes)	$1.10 per lb.
5 lbs. (½ lb. boxes)	1.00 per lb.
5 lb. box	.90 per lb.

★

PINK BASE-PLATE NO. 7

A laboratory wax for base-plates, waxing up, boxing impressions, and other purposes where economy is desired. Holds teeth firm, carves clean.

Sheets .047" x 2 15/16" x 5½"

1 lb. (½ lb. boxes)	$1.15 per lb.
5 lbs. (½ lb. boxes)	1.08 per lb.
5 lb. box	.97 per lb.

★

PINK BASE-PLATE PARAFFIN AND WAX

Remarkably tough, medium hard. Excellent for trial bases and setting up teeth; particularly good for partial and edentulous bites.

Sheets .047" x 2 15/16" x 5½"

1 lb. (½ lb. boxes)	$1.25 per lb.
5 lbs. (½ lb. boxes)	1.15 per lb.
5 lb. box	1.05 per lb.

★

YELLOW BASE-PLATE

Pure beeswax carefully compounded. Tough and pliable. For those who like a yellow wax. Sheet form handy to use.

Sheets .036" x 2 15/16" x 5½"

1 lb. (½ lb. boxes)	$2.10 per lb.
5 lb. box	1.80 per lb.

S. S. White BLUE REGULAR

A definite contribution to the direct and indirect inlay techniques. It becomes ideally plastic over an alcohol or Bunsen flame, doesn't crumble during manipulation, flows under slight pressure into minute recesses, carves without chipping or dragging, and resists distortion during removal of the pattern. Moreover, it has the right shade of blue for excellent contrast to tooth enamel and tissues, and good visibility for carving. It leaves a clean mold.

Box of 12 square sticks	$ .60
6 boxes	3.30
12 boxes	6.30

YELLOW BITE AND IMPRESSION

Pure beeswax for impressions and bites. Useful as foundation for colloid impressions in water cooled trays.

Sheets .010" x 3⅜" x 3⅜"

½ lb. box (12 sheets)	$2.00 per lb.
5 lb. box	1.75 per lb.

Prices for larger quantities given upon request.
Prices subject to change without notice.

for every dental need

INLAY WAX

AND *HARD

*Guaranteed to comply with A.D.A. Specification No. 4, First Revision.

GREEN INLAY NO. 4
BLACK INLAY NO. 5

Have a wide popularity. Leave clean mold.

Box of 15 hexagonal sticks	$ .50
6 boxes	2.75
12 boxes	5.15

PINK CASTING

For patterns when casting saddles, bars, clasps, stabilizers, one-piece cast dentures, etc. Free of brittleness; adapts easily; leaves a clean mold.

Sheets, B & S gages—22, 24, 26, 28, 30

Box of 32 sheets, 3½" x 3½" separate or assorted gages	$ .75 per box
6 boxes	4.00

★

CASTING WAX NO. 6

DARK RED

For clasps, dummies, indirect inlays, etc. A tough wax, yet it flows and carves beautifully. Leaves a clean mold.

Handy size can.....$.50 per can

★

CROWN STICKY WAX

Excellent for general laboratory work. Very sticky when warm; holds steadfast and rigidly at high room temperatures. Hardens quickly; easily removed with boiling water.

Box of 18 hexagonal sticks	$ .50 per box
6 boxes	2.75
12 boxes	5.10

★

TENAX WAX

For base-plates. A time saver when thin plates are desired; it eliminates dressing down when finishing. Pink paraffin and wax; extremely tough and strong.

Sheets .036" x 2 15/16" x 5⅛"

1 lb. (½ lb. boxes)	$1.60 per lb.
5 lbs. (½ lb. boxes)	1.45 per lb.
5 lb. box	1.30 per lb.

For Sale by Your Local Dealer

THE S. S. WHITE DENTAL MFG. CO., PHILADELPHIA, PA.

Camel invites you

TO ENJOY THE INTERESTING FEATURES
OF THE CAMEL CIGARETTE EXHIBIT AT THE

A.M.A. CONVENTION—JUNE 8 TO 12

- See for the first time the dramatic visualization of nicotine absorption from cigarette smoke in the human respiratory tract—
- See the giant photo-murals of Camel laboratory research experiments in the burning rate and nicotine production in the smoke of the 5 largest-selling brands of cigarettes—
- Keep up to the minute on international news with the Camel Cigarette *Trans-Lux* "flash" bulletins, while you enjoy a supply of slow-burning Camel Cigarettes—
- The smoke of slow-burning CAMELS contained less nicotine than that of the 4 other largest-selling brands tested—less than any of them—according to independent scientific tests of the smoke itself!

  In the same tests, CAMEL burned slower than any of the 4 other largest-selling brands tested.

- **SEND FOR REPRINT** of an important contribution to medical literature—"The Cigarette, The Soldier, and The Physician," The Military Surgeon, July, 1941—revealing many new angles about smoking. Write Camel Cigarettes, Medical Relations Division, 1 Pershing Square, New York City

Camel

THE CIGARETTE OF COSTLIER TOBACCOS

84th Annual Meeting—Boston, Massachusetts, August 24-28, 1942

WHEN BETTER IS AVAILABLE. DEMAND IT!

Of course, Ticonium is lighter, stronger and denser. These are the advantages of Ticonium with which you are probably most familiar. In addition to these desirable qualities, Ticonium possesses four "extra" advantages. They promise you "added" satisfaction.

"YOU GET MORE WITH TICONIUM"

Only TICONIUM *possesses these extra advantages...*

1. **DENSER CASTINGS**—Electrically melted, Ticonium maintains its original physical properties.
2. **STEEL DIE ACCURACY**—The great accuracy of Ticonium restorations saves time in fitting and adjusting.
3. **CAST OR WROUGHT CLASPS**—Ticonium may be fabricated with either cast or wrought wire clasps of the same basic alloy.
4. **EASY TO SOLDER**—Repairs and additions can be made with a high grade gold solder and Ticonium flux.

TICONIUM

413 North Pearl Street, Albany, N. Y.

CONSULT YOUR NEAREST TICONIUM LABORATORY

Meet Old Friends, Make New Acquaintances

The great tooth-cleansing power of Du Pont "EXTON" in the design specified by leading periodontists

Ends animal bristle trouble!

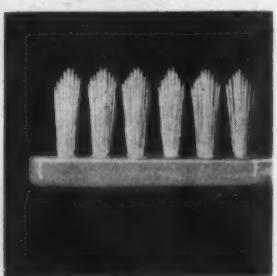
Here is the toothbrush without bristle troubles — splitting, softening, or shedding. Dr. West's "EXTON" brand bristling makes it possible. These bristles are non-porous, water-repellent to a degree never before possible, strong and resilient even when wet.

This brush is highly salutary for gum massage as well as for brushing the occlusal, labial, lingual and interdental surfaces of the teeth. The bristles are unaffected by peroxides, perborates or the surgical antiseptics. Hence use of a Dr. West's Oro is indicated in these treatments.

In the brushing technique you prefer and prescribe, you will find the straight brushing plane and remarkable "Exton" bristles of the Miracle-Tuft Oro ideal.

Because of their great strength and resilience, Dr. West's "Exton" bristles cannot split, break off or shed. They will not scratch enamel. 6000 scrubs on a bristle-testing apparatus destroyed natural bristle brushes, scarcely harmed Miracle-Tuft. Conservatively, a Miracle-Tuft will outlast any other toothbrush 2 to 1.

Miracle-Tuft Oro Brushhead Shown Actual Size ➡



Brushhead is 1¼" long. Bristle tufts are widely spaced in two rows of 6 tufts each, and properly trimmed for interproximal massage brushing. Two textures —hard and medium.

Dr. West's Miracle-Tuft ORO Toothbrush

50¢

Sealed in glass . . . Surgically Sterile!

The thoughts of patients who are just a **bundle of nerves** may be uncomplimentary to dentistry . . . and dentists. Unpleasant memories of long, ceaseless, restless hours of turning and tossing and sleeplessness may cause patients to break appointments, delay visits, neglect even to return. You can eliminate much physical and psychological pain and fear, build good will, hold confidence by using anesthetic that's safe and reliable and leaves no regrets—Minimax Procaine Solutions.

Minimax solutions are not only chemically compounded to fill all requirements for efficacy, uniformity and dependability—but are packaged to keep and protect their "vim, vigor and vitality" over long periods. The patented Hy-Vac container is dustproof, dampproof, wholly oxygen free; it is an efficient device designed to maintain the potency of solutions prepared for your use. Remember Minimax Procaine HCL solutions with Epinephrin minimize patient apprehension, alleviates pain, makes operations more pleasant for your patients and for you.

Prepared in 3 strengths: Epinephrin 1:30000, 1:50000 and 1:70000. Supplied in two size cartridges: large for standard syringes, small for short syringes: 25 ctgs. in each Hy-Vac package.

Hy-Vac package patented U.S. Patent Number 2,215,479.

MINIMAX

The Minimax Co. · Medical & Dental Arts Bldg. · Chicago

Journal Income Helps Build Better Dentistry

Smooth!

Yep, S-C is as smooth as the peach-bloom cheek of a wrapped-in-cotton glamour gal—which means it's not only easy to work with, but also takes a grand finish.

S-C CEMENT

Buy The 1-Pound Economy Package

MAIL THIS COUPON FOR FREE SAMPLE

Stratford-Cookson Company
4058 Haverford Ave., Philadelphia
Please send me my free sample of S-C Cement. I'll be very glad to try it.

Name_____

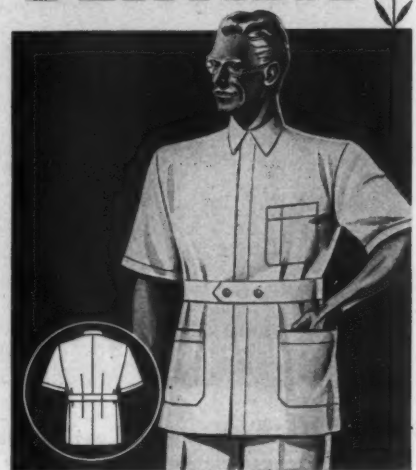
Street_____

City & State_____

THE MARK OF MERIT · STRATFORD-COOKSON COMPANY

STRATFORD-COOKSON COMPANY
Manufacturers of Dental Supplies
4058 HAVERFORD AVENUE • PHILADELPHIA

HERE'S A COAT Created FOR DENTISTS



A world of dentists have waited for this coat—a garment so smartly different from the ordinary professional coat, you will want one immediately. It is handsome, smooth, modern in styling and for comfort can be worn without shirt, collar and tie. The full-length fly front conceals a zipper—for a neater closing plus *extra* convenience.

The coat is made of Angelica's exclusive Sanforized-Shrunk White Twill—a fabric that wears and wears and still keeps its smart appearance! Belt is attached in back and buttons in front with two sewed-on pearl buttons. Sizes 34-44.

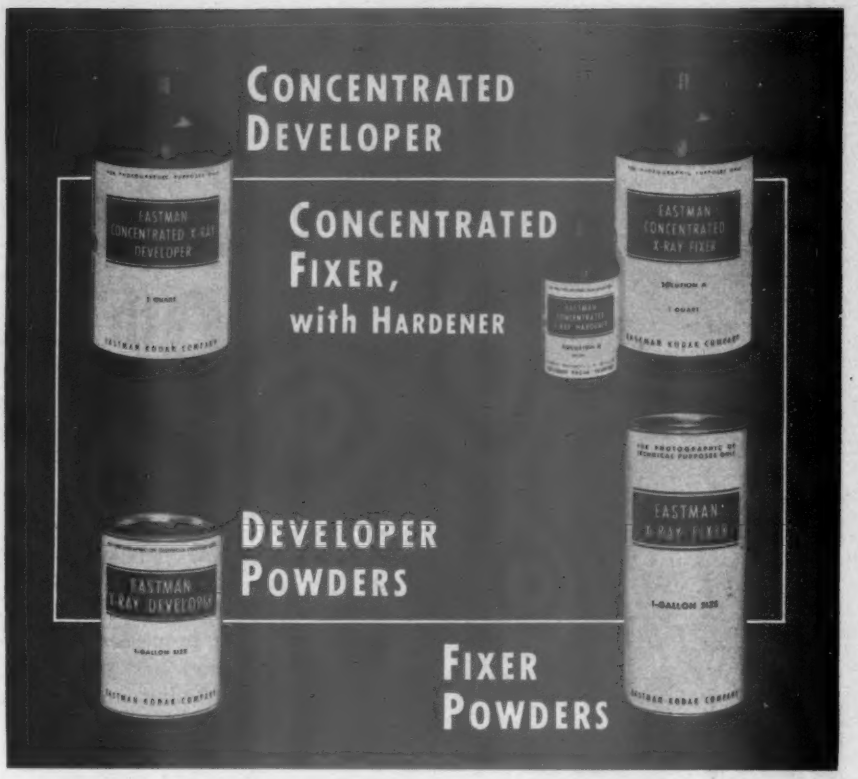
Order #378. Ea., $2.95. 3 for $8.40.

Free Delivery in U. S. if Full Payment Accompanies Order
Write for Free Catalog

ANGELICA WASHABLE UNIFORMS

Visit Our Branch Retail Stores or Write to Branch Nearest You

ST. LOUIS.....1412 Olive St.
NEW YORK....107 W. 48th St., Dept. 12
CHICAGO.177 N. Michigan Ave., Dept. W
LOS ANGELES.1101 S. Main St., Dept. W



Perhaps you prefer to make up your x-ray film processing solutions from concentrated liquids . . . perhaps from powders—in either case, you can specify "Eastman" with complete confidence. Both the liquids and the powders are prepared with laboratory care, from *Kodak Tested Chemicals* . . . both provide stable solutions.

In films . . . in exposure, processing, and viewing accessories, the Eastman line is equally complete. ***Eastman Films*** are available in four types: Bite-Wing, Periapical, Occlusal, Extra-oral . . . in the sizes the profession favors, with the characteristics you prefer. ***Eastman Accessories*** range all the way from film dispenser to radiograph illuminator—every item designed to add to the efficiency of the radiodontic routine.

To get back to Eastman processing chemicals—why not place a standing order with your regular dental dealer . . . to assure periodic deliveries of the type developer and fixer you prefer . . . to remind you to replace your solutions at the most advantageous time? Eastman Kodak Company, *Medical Division*, Rochester, N. Y.

Eastman X-RAY Materials
...THE COMPLETE LINE

TWO GENERATIONS of AMERICAN DENTISTS HAVE GROWN UP WITH 20th CENTURY ALLOY

20th Century has always been the best alloy we've known how to make. And, as years passed and our manufacturing processes improved, 20th Century has grown constantly better. Today, to the dentists of this generation, we pledge that 20th Century will continue to serve them as a dependable, durable alloy—smooth in working properties, and strong enough to withstand year after year of service.

FOR MODERN MATERIALS CALL ON *Caulk* MILFORD, DEL.

By LEO WINTER

877 Pages, 1,019 Illustrations, 5 in Color.

Price, $10.00.

Step-by-Step Illustrations That SHOW *You* HOW

OPERATIVE DENTAL SURGERY

Reviewers Say . . .

"Truly a great book and one that answers a long-felt want. This is another book for the general practitioner as well as the specialist."—**Bulletin of the Oklahoma State Dental Society.**

"Oral Surgeons and general practitioners who include oral surgery in their practice will find much in Dr. Winter's book of a practical nature to aid them in their work." — **Pennsylvania State Dental Journal.**

"It is so written that there is nothing confusing about anything." — **West Virginia Dental Journal.**

Since the active dental practitioner of today is already well-acquainted with pathology, bacteriology, etc. (the essentials of successful oral surgery), this brand-new volume lays stress upon symptomatology and diagnosis, with full and detailed information as to the best methods of treatment.

Dr. Winter describes only those methods which in his own experience have proved best—in other words, you learn methods which have withstood the acid-test of actual clinical use. In discussing these Dr. Winter states exactly and in detail what he does under given circumstances. In many cases, of course, several methods of treatment are of equal value; however, the method which Dr. Winter has adopted is presented in complete detail.

All exceptional conditions are not mentioned, but all the circumstances with which the practitioner is most commonly called upon to deal are thoroughly covered.

OTHER NEW MOSBY DENTAL TEXTS

Thoma's **ORAL PATHOLOGY** — 1,336 pages, 1,370 illustrations, 137 color plates. **PRICE, $15.00.**

Swenson's **COMPLETE DENTURES**—736 pages, 905 illustrations, 10 in color. **PRICE, $10.00.**

Tylman's **CROWN AND BRIDGE PROSTHESIS**—815 pages, 1,000 illustrations, 9 in color. **PRICE $10.00.**

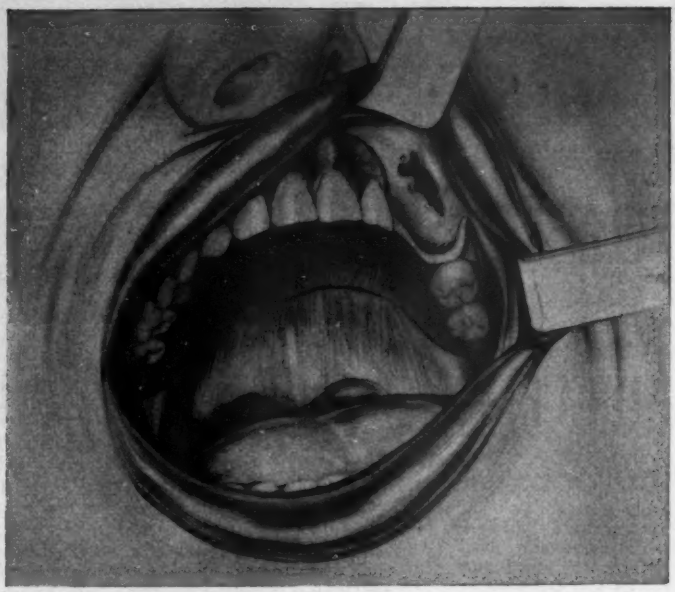
Dobbs-Prinz-Rickert's **PHARMACOLOGY AND DENTAL THERAPEUTICS** — New 8th Edition. 488 pages, 44 illustrations. **PRICE, $6.50.**

The C. V. Mosby Company ADA 6-42
3525 Pine Blvd., St. Louis, Mo.

Gentlemen: Send me Winter's OPERATIVE ORAL SURGERY, price $10.00. ____Attached is my check. ____Charge my account.
Also send me_____

*Dr.*_____

*Address*_____



IRRITATION
IN THE DENTURE AREA

Tender gum tissues, unaccustomed to the pressure of a new denture, sometimes become sensitive and irritated. When tissues are so sore that they react unfavorably to the new denture the period of adjustment and adaptation may be unduly prolonged.

FASTEETH checks and soothes soreness and inflammation due to chafing and hyperacidity, thus helping patients to tolerate new dentures quicker and better. Notice the tone of tissues in cases where FASTEETH is used.

FASTEETH
Alkaline DENTURE POWDER

CLARK-CLEVELAND, INC., BINGHAMTON, N.Y

The Wide Difference in Acrylic Liquids

ONLY two manufacturers in America make, from its original raw materials the pure, methyl methacrylate liquid such as you find in Crystolex.

Others obtain their liquids by cracking acrylic molding scrap which often contains non-acrylic materials. Also, such dangerous by-products as formaldehyde and acetone may develop in the distillation.

These so-called acrylic liquids betray their origin by their sour, rancid odor and by their refusal to mix readily unless aided by ample foreign adulterants in the powder.

Here is one of several strong, provable reasons why Crystolex is different and better. Your own nose will tell you instantly and conclusively. Your satisfied patients will pile up the proof.

Standardize on Crystolex, the 100% acrylic, formulated exclusively for Dentistry.

KERR

REG. U.S. PAT. OFF.

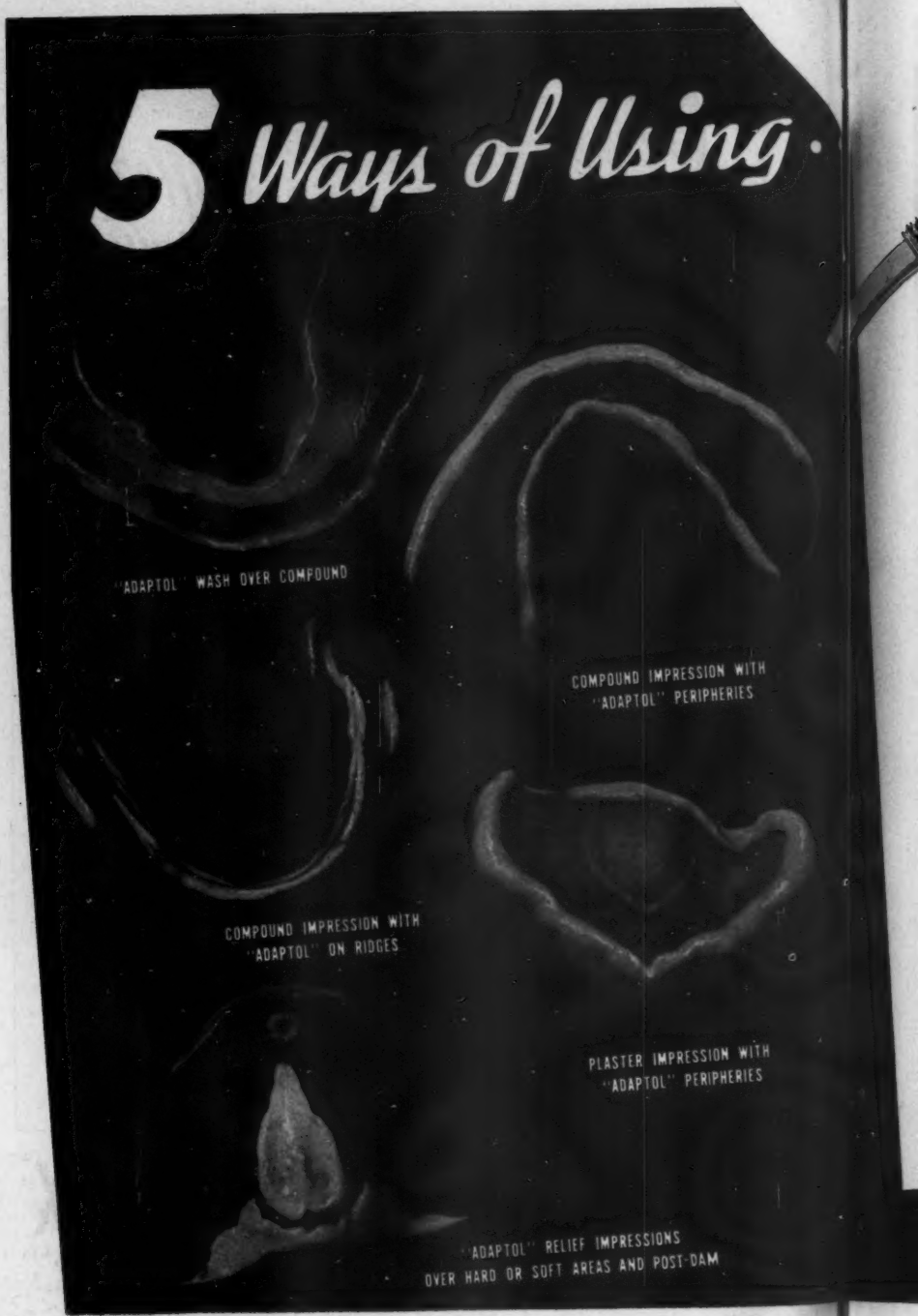
DENTAL MFG. CO.

Detroit

That dentistry deserves materials of the highest quality only is the steadfast belief and principle of this Company. Crystolex is Kerr Quality. We offer you nothing less.

CRYSTOLEX

MANUFACTURED BY ROHM & HAAS CO.


5 Ways of Using
"ADAPTOL" WASH OVER COMPOUND
COMPOUND IMPRESSION WITH "ADAPTOL" PERIPHERIES
COMPOUND IMPRESSION WITH "ADAPTOL" ON RIDGES
PLASTER IMPRESSION WITH "ADAPTOL" PERIPHERIES
"ADAPTOL" RELIEF IMPRESSIONS OVER HARD OR SOFT AREAS AND POST-DAM

JELENKO
Adaptol
TRADE MARK Reg. U. S. Pat. Off.

in YOUR Impression Technic

Primary Uses of "ADAPTOL"

For Full Impressions.

—

For Immediate Denture Impressions.

—

For Rebasing Full and Partial Dentures.

•

PRICE

6-Tube Package — $3.50

At Your Dealer

WHETHER you use compound or plaster, the open or closed mouth technic, you will get infinitely better-fitting dentures using "ADAPTOL".

Illustrated are five ways of using "ADAPTOL" to get perfect reproductions of critical areas — self-muscle-trimmed peripheries; true posterior limits; accurate relief of hard and soft areas; sealing soft palate, etc.

"ADAPTOL" gives a perfect impression of these critical areas because:

1—It is self-moulding at mouth temperature.

2—It will not over-extend, compress or displace even soft, flabby tissue.

3—It will not set in the mouth until YOU chill it with cold water.

4—Hence, take your time with "ADAPTOL". It won't set until YOU set it; and "ADAPTOL" can be resoftened and added to repeatedly.

Write for Literature

J. F. JELENKO & CO., INC.

Manufacturers of Dental Golds and Specialties

136 West 52nd Street New York, U. S. A.

A *Controlled* Silicate Mix

The inconstancy of silicates is now partially overcome through control of the mass under spatulation—with ASTRALIT, the Improved Translucent Silicate.

Astralit adheres to the slab in all consistencies of mixing. (An important and much-needed improvement for silicates.) Other definite Astralit advantages are — very low disintegration — durability — and excellent blending qualities.

Astralit for anteriors satisfies the same as Petralit for posteriors.

ASTRALIT

the Improved Translucent Silicate

Introductory 4-Color Unit

$5.00

($8.00 Value)

Contains:

- 4 half-portions of powder (most popular shades)
- 1 full portion liquid
- 1 shade guide

Astralit in constant use since 1909—Improved 1937

Astralit is on the list of A.D.A. Certified Products as complying with Specification No. 9 for silicate cement.

You can order direct, giving name of your dealer, or thru any dental depot.

PREMIER DENTAL PRODUCTS CO.
PHILADELPHIA, PA.

What They Say About A. D. A. Group Insurance

★

From Voluntary Letters Received Recently

★

New York—"Feb. 21, 1942

. . . I desire to state that the prompt action that you have given this claim has been most gratifying and appreciated. The manner in which you have handled this claim has indicated a certain feeling on your part to see that the benefit is paid with as little annoyance as possible and your actions in instigating the claim have been unusual."

★

Connecticut—"Feb. 21, 1942

. . . I am in receipt of your letter and check. Thank you for your prompt attention. You have been very courteous and helpful and I am grateful for your kindness. It would be a pleasure for me to recommend your Company because of my personal dealings."

★

Pennsylvania—"March 7, 1942

. . . For your prompt settlement of my husband's claim in the Great-West Life Assurance Company, I am deeply grateful. This will see my two boys through college. One boy is now in Dental School. He hopes to be insured with you as soon as he begins practice."

★

Illinois—"March 21, 1942

. . . At this time, when so many matters come to my attention and seem overwhelming, because of my inexperience, it has seemed so very fine for you to be not only businesslike but sympathetically helpful."

★

—Names Furnished on Request—

CRESILVER

REG. U.S. PAT. OFF.

THE HIGHEST PRACTICAL CONTENT SILVER ALLOY AVAILABLE TO DENTISTS

ALWAYS RETAINS ITS SILVERY-WHITE LUSTRE

CONFORMS TO FEDERAL AND A. D. A. SPECIFICATIONS

CRESCENT DENTAL MFG. CO.
1839 S. Crawford Ave., CHICAGO

A. D. A. Membership Certificate Frames

Display your annual A.D.A. Membership Certificate in an attractive and appropriate frame.

In either black or natural wood finish—removable back.

Price 50c

GEISTER AND ZMICH

Picture Frames, Glass Mounts, Mats & Drawings Mounted

226 S. Wabash Ave., Chicago, Illinois

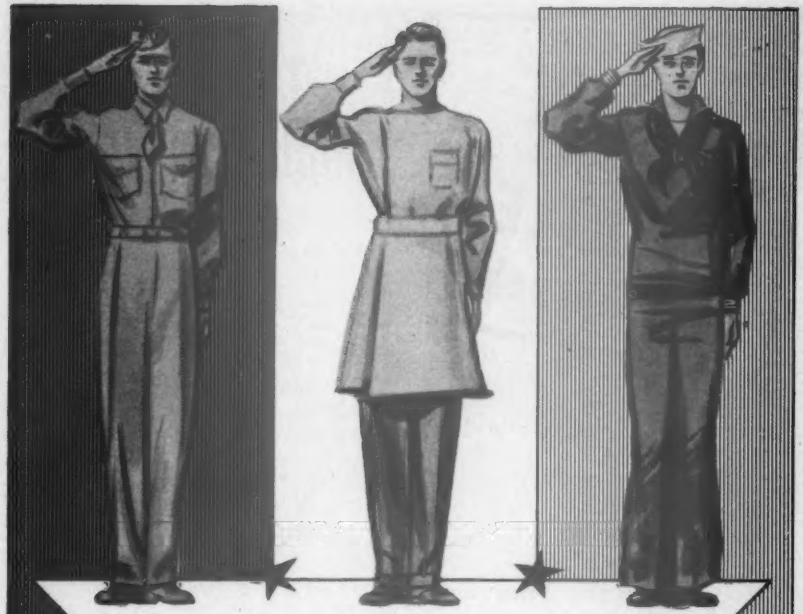
Enclosed is 50c for one A.D.A. Membership Frame. ☐ **Black** ☐ **Natural Wood**

Name_____

Street_____

City_____ **State**_____

Please print plainly full name and complete address.



THE ARMED FORCES ARE ALSO USING

PROCO-SOL

The dentists in the United States Army and Navy are using the same fresh Proco-Sol local anesthetics as are the discriminating dentists in civilian life. It is with a great deal of pride and duty that we realize our obligation to the armed forces of this country.

We stand ready to offer our services and facilities to aid the "all-out" policy of our country to help attain a complete, speedy, sure, decisive Victory in this "War of Survival".

PROCO-SOL CHEMICAL COMPANY, INC.

1233 SPRING GARDEN STREET, PHILADELPHIA, PA.

Manufacturers of Fine Local Anesthetics

Often called
THE IDEAL CLEANSING
AND STIMULATING
AGENT . . . the

DR. BUTLER Toothbrush

A stimulating agent first . . . cleansing is secondary and automatically follows.

Make Your Own Comparison

Send 40c for two adult brushes. Then make your own comparison with other brushes!

SEND THIS COUPON TODAY

JOHN O. BUTLER CO. ADA 6-42
7359 Cottage Grove Ave., Chicago, Ill.

I enclose 40c for two brushes. Send me:

NATURAL	ARTIFICIAL
☐ Medium Bleached	☐ Medium Bleached
☐ Hard Bleached	☐ Hard Bleached
☐ Extra Hard Bleached	☐ Extra Hard Bleached

Dr. .....

Address .....

City & State .....

Lectures on Military Dentistry

Collected Lectures on Military Dentistry from the Army Medical and Dental Schools.

Revised Edition
104 pages. 88 illustrations.

Published by the Dental Preparedness Committee under authorization of the American Dental Association and with the permission of the Surgeon General of the United States Army.

Through the publication of "Lectures on Military Dentistry," the Preparedness Committee is presenting a volume which can be of vital use to the profession in the defense program of the nation. This publication can be used by organized study club groups as a basis for home study of the treatment of conditions incident to the defense training program and actual warfare. It is prepared in the form of sixteen lectures, each lecture dealing with a particular phase of dental science in its adaptation to the defense program.

American Dental Association,
212 E. Superior St.,
Chicago, Ill.

75c per copy

Enclosed please find $_____

for _____ copies of Lectures on Military Dentistry.

NAME _____

STREET _____

CITY _____ STATE _____

Please print plainly full name and complete address.

In the most comprehensive research ever conducted on Red Copper Cements, FLECK'S led the field in all 21 tests.

Alert doctors quickly grasped the full significance of Fleck's powerful, *permanent germicidal properties*. A protective cementing technique was born which spread rapidly in thousands of offices, clinics and hospitals. Today, Fleck's Red Copper is used all over the world as "extra germicidal protection" for all posterior cementations. It has been found extremely efficacious in children's dentistry.

MIZZY, INC. • *MANUFACTURERS* • 105 EAST 16TH ST., NEW YORK

YOUR CHILD'S TEETH

For Dentists, Teachers and Parents

44 pages

60 illustrations

Explains the growth of teeth from the third month of prenatal life through the time of eruption of the permanent teeth, indicating the important relationship of dental health to the child's development.

Price—10c per single copy; 50 copies $4.50; 100 copies $8.00; 500 copies $35.00; 1,000 copies $60.00.

BUREAU OF PUBLIC RELATIONS
AMERICAN DENTAL ASSOCIATION
212 E. Superior Street, Chicago, Ill.

A BENEFICIAL PRODUCTION CIRCLE

Inclosed is:

- ☐ 10c for 1 copy
- ☐ $4.50 for 50 copies
- ☐ $8.00 for 100 copies
- ☐ $35.00 for 500 copies
- ☐ $60.00 for 1,000 copies

} Your Child's Teeth

NAME_____

STREET_____ CITY_____ STATE_____

Please print plainly full name and complete address.

Q. Now, Doctor, from your point of view, just what is canning?

A. Well, to me canning is something more than just another method of food preservation; it is one of the important means whereby many foods essential for proper nutrition are made readily available to Americans in all localities during all seasons of the year. (1)

American Can Company, 230 Park Avenue, New York, N. Y.

---

(1) 1939. The Canned Food Reference Manual, American Can Company, New York.

1938. Commercial Fruit and Vegetable Products, Second Edition, W. V. Cruess, McGraw-Hill, New York.

1937. Appertizing or the Art of Canning; Its History and Development, A. W. Bitting, Trade Press-room, San Francisco.

1936. A Complete Course in Canning, Sixth Edition, Press of "The Canning Trade," Baltimore.

The Seal of Acceptance denotes that the nutritional statements in this advertisement are acceptable to the Council on Foods and Nutrition of the American Medical Association.

which is more deadly?

You probably would say the loaded gun . . . and you would be right. But fill a dental cartridge with an unsterile procaine solution, and it may become as dangerous as any firearm. *Safety* in procaine anesthesia depends largely on the purity and sterility of the solution . . . a fact which Abbott never forgets in the manufacture of its Procaine Dental Cartridges. The production methods and control techniques employed are those developed and perfected during twenty-four years of practical manufacturing experience. This unique experience has led to numerous improvements resulting in a procaine solution of uniform purity, potency and low toxicity, meeting the most precise control tests and assays. The solutions are isotonic so that they may produce the least osmotic disturbance in the infiltrated tissues. In addition, each cartridge is plainly labeled to identify its contents . . . a feature every dentist will appreciate. Each label carries a serial number indicating the thorough beginning-to-end control for assuring purity and potency. Abbott Laboratories, North Chicago, Ill.

Abbott's

Procaine Hydrochloride 2% with Epinephrine 1:30,000
Procaine Hydrochloride 2% with Epinephrine 1:50,000
Procaine Hydrochloride 2% with Epinephrine 1:60,000
Procaine Hydrochloride 2% (without Epinephrine)

In boxes of 10 and 100 cartridges

Make the Journal Your Buyer's Guide—

★ VITALLIUM *in Action on the "Health Front"*

Compare the Achievements of Vitallium with those of Any Other Dental Alloy

Here are some of Vitallium's duty assignments in this war-time emergency:

- **U. S. ARMY**
- **U. S. NAVY**
- **U. S. VETERANS ADMINISTRATION**
- **WAR PRODUCTION**

VITALLIUM, in its service to the nation's health in peace and war, is used *in restorative dentistry* for full and partial dentures, for obturators, mandibular fracture appliances, etc.

In orthopedic surgery, VITALLIUM is used for the internal fixation of fractures, for the mobilization of stiff joints, for the replacement of cartilage, for sectional bone replacements, for tubes for internal duct repair, for various implantations in the human body, for many additional vital applications.

VITALLIUM IS THE ONLY DENTAL ALLOY THAT IS SUPPORTED IN ITS PRACTICAL SURGICAL ACHIEVEMENTS BY RECORDED SUCCESSFUL CASE HISTORIES OF THE MOST INCONTROVERTIBLE DOCUMENTARY CHARACTER.

In the near future, you will receive a book entitled "*Bibliography and Excerpts from Dental and Surgical Literature on the Use of Vitallium Prostheses.*" The casual reading of this authentic document can leave no doubt as to the essential uses of Vitallium in Dentistry and Surgery.

AUSTENAL LABORATORIES, INC.
NEW YORK CHICAGO

YOU CAN OBTAIN OUTSTANDING SERVICE FROM THE VITALLIUM LABORATORY NEAR YOU

★TRADE MARK REG. U.S. PAT. OFF. BY AUSTENAL LABORATORIES, INC.

The Newer Concepts of Meat in Nutrition

Meat

AND THE PROBLEM OF

Daily Tissue Repair

AS shown by the investigations of Folin,[1] the metabolism of protein is of two distinct kinds—endogenous and exogenous. The former occurs at a constant rate in adults and represents the replacement of protein tissues which are broken down in the processes of living; it is not influenced by physical activity. In the exogenous metabolism of protein, which is variable and depends upon the amount of protein ingested, the amino acids resulting from protein digestion are utilized for energy purposes and ultimately lead to the formation of such excretion products as urea and sulfur. In practical nutrition, it is essential that the food intake be adjusted so that sufficient protein is provided to satisfy the requirements of endogenous metabolism or "wear and tear" replacement.

One of the theories advanced for the genesis of caries claims that excessive carbohydrate consumption may play a causative role.[2] Hence a lower carbohydrate diet may be indicated in some caries-susceptible persons.

In recent years the concept of the biologic value of proteins has received increasing attention. The endogenous metabolism of protein can take place normally only if the protein foods ingested provide all the essential amino acids. Thus studies on the amino acid content of proteins[3, 4, 5, 6] have proved of value in the calculation of satisfactory diets. They not only show the importance of specifying the quantity of protein needed, but also reveal the kind of protein foods required to assure adequate amounts of the essential amino acids.

The proteins of meat contain all of the ten essential amino acids in approximately the proportion which best satisfies the requirements of man, hence are of high biologic value. Meat is able to satisfy the protein requirements, even when fed to the exclusion of all other sources of protein.

1. Folin, O.: A Theory of Protein Metabolism, Am. J. Physiol. *13*:117, 1905.
2. Bunting, R. W.: Diet and Dental Caries, New York State J. Med. *39*:18 (Jan. 1) 1939. What Procedures Can Be Instituted in the Infant and Preschool Life of the Child for the Prevention and Control of Dental Caries, J. Am. Dent. A. *26*:375 (Mar.) 1939.
3. Aberhalden, Emil; Baertich, Edmund, and Ziesecke, Walter: Über den Gehalt von aus Kabeljau gewonnenem Muskeleiweiss an Aminosäuren, Ztschr. f. physiol. Chem. *240*:152, 1936.
4. Csonka, F. A.: Proteins of Yeast (Saccharomyces Cerevisiae), J. Biol. Chem. *109*:703 (May) 1935.
5. Sasaki, Shuiki: Monoamino Acids of Soybean Protein, J. Agric. Chem. Soc. (Japan) *11*:321, 1935; Chem. Abst. *29*:6616, 1935.
6. White, A., and Gordon, W. G.: Basic Amino Acids Yielded by Thyroglobulin, Proc. Soc. Exper. Biol. & Med. *32*:354 (Nov.) 1934.

The Seal of Acceptance denotes that the statements made in this advertisement are acceptable to the Council on Foods and Nutrition of the American Medical Association.

American Meat Institute

CHICAGO

The same basic ingredient! And though a heaping plateful of Dr. Wernet's Powder might not be regarded as an after-dinner treat, it would be no less pure. For it is made from the same grade of imported gum that goes into finest ice cream as a stabilizer—the most expensive available for denture powder.

Your patients will appreciate an introduction to this premier denture powder, especially during the dreaded early "seating" period. By impartial laboratory test Dr. Wernet's Powder is 26.1% whiter and purer than the average of leading competitors, as well as 50% more viscous (for maximum security and greater shock-resistance) and 46.5% more absorbent (for faster denture control).

Dr. Wernet's Powder is as safe and dependable as it is soothing and digestible.

Free supply sent on request, Wernet
Dental Mfg. Co., Dept. P-4, 190
Baldwin Ave., Jersey City, N. J.

DR. WERNET'S POWDER

26.1% WHITER AND PURER

PROFESSIONAL PROTECTION

SINCE 1899
SPECIALIZED
SERVICE

In addition to our Professional Liability Policy for Private practice we issue a special

MILITARY POLICY

to our policyholders in the Armed Forces at a

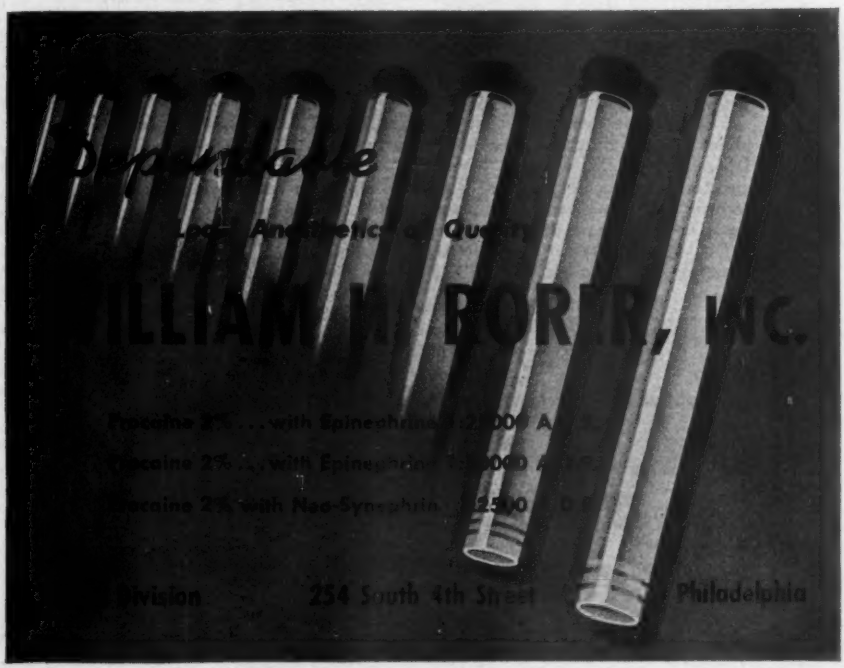
REDUCED PREMIUM

THE

MEDICAL PROTECTIVE COMPANY

OF

FORT WAYNE, INDIANA



. . . *without loss of protection*

Conservation and thrift, so important today, have always been intrinsic advantages of Kolynos* Dental Cream. Kolynos is concentrated. It is best used only ½" on a dry brush. By proper use it lasts twice as long. Kolynos has a dual cleansing action:

1st—The cleansing, refreshing foam helps remove mucous plaques and food debris;

2nd—The action of carefully precipitated chalk polishes efficiently without harmful abrasion of the enamel.

Kolynos has a pleasant taste acceptable to the most discriminating type of patient.

KOLYNOS
DENTAL CREAM

Recommend Kolynos when your patients ask you about a good dentifrice.

ACCEPTED AMERICAN DENTAL ASSN.

*Reg. U. S. Pat. Off.

THE KOLYNOS COMPANY · NEW HAVEN, CONN.

Widen the Beneficial Circle

MEN AGAINST PA

"A new era in tooth pulling"

Thus exclaimed Dr. Horace Wells when he awoke from the effects of nitrous oxide, administered to him, at his own request, by his associate Dr. John Riggs. A molar tooth was removed painlessly from his mouth. The date was December 11, 1844; the place Dr. Wells' office in Hartford.

The previous night, Dr. Wells had attended a demonstration by a Dr. Colton, where the hilarious effects of nitrous oxide were shown. One of those who had inhaled the gas ran through the aisles, while under its influence, in pursuit of an imaginary enemy; then sat down next to Dr. Wells. The doctor, whose perceptive mind was always on the alert for something that would alleviate suffering during extractions, observed that while the man's shin was injured and bleeding, he was entirely unconscious of any pain.

Thus the credit for the discovery of anesthesia by inhalation belongs to Dr. Horace Wells. Others may have improved on the agents or the methods, but of all the Men Against Pain, Dr. Wells, a dentist, is pre-eminent.

Dentistry may well be proud of its part in the miracle of anesthesia and the blessing it has bestowed on humanity.

T PAIN . . . .

1818-1848

Horace Wells to MONŌCAINE

It was the year 1911. Cocaine was the local anesthetic commonly used. Toxic manifestations—even death—were frequent occurrences at the chair. Severe postoperative pain seemed inseparable from local anesthesia.

These were the existing conditions when the founder of the Novocol Chemical Mfg. Co., Inc. conceived an idea to make local anesthesia what it was intended to be —a safe procedure to make dentistry painless during and after the operation.

For thirty-one years Novocol improvements in local anesthesia have followed one after another—*Novampuls, Anestubes, Metal Caps, Vacuum Packing, Flamo Needles, etc., etc.*

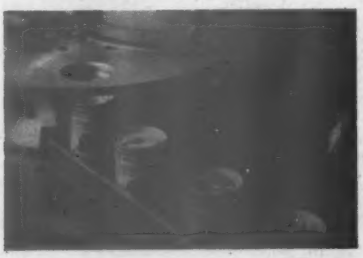
Not satisfied with the available local anesthetics, our chemists probed into the world of atoms and molecules. In 1937, Monōcaine HCl was introduced—a product of our laboratories and a result of our researches. Monōcaine HCl is a distinct forward step in the field of local anesthesia since the discovery of Novocain in 1905.

A dentist, Horace Wells, discovered anesthesia in 1844. We are proud of the fact that from dentistry, too, came Monōcaine HCl—almost a century later.

Is Monōcaine better than procaine? By their choice, the dental profession answers this question. More than 90% of all Novol users today prefer Monōcaine to procaine. They base this choice on their own crucial clinical findings at the chair. They compare, observe and decide!

Every dentist, like Horace Wells, is a Man Against Pain. You, too, should *Black-out Pain with Monōcaine!*

The word "Monōcaine" is the registered trade mark of Novocol Chem. Mfg. Co., Inc., designating its product 2-iso-butyl amino ethyl para amino benzoate.



NOVOCOL CHEMICAL MFG. CO., Inc.

BROOKLYN, NEW YORK

Toronto • London • Buenos Aires • Rio de Janeiro

Classified Advertising Department

Advertisements cost $2.00 not exceeding 30 words, additional words 10c each.
An extra fee of 25c is charged advertisers who have answers sent care of A.D.A.
Remittance must accompany classified ads.

FOR SALE: CDX WALL-TYPE MAHOGANY X-RAY, fine condition. All dark-room equipment and new 8 x 10 Cassette included, $350.00. Heavy duty air compressor (Ritter), like new, $75.00. American Cabinet, mahogany, steel and wood construction. Like new, $100.00. Cash. Dr. M. G. DeGrazia, Valparaiso, Indiana.

DENTIST OF LONG EXPERIENCE would be interested in taking over practice of man in service for duration. New York license. Address E-3841, American Dental Association, 212 E. Superior Street, Chicago, Ill.

DENTIST, WASHINGTON, D. C. LICENSE, desires situation with dentist in general practice. Many years' experience. Exempt from draft. Address E-3840, American Dental Association, 212 E. Superior St., Chicago, Illinois.

BURS RECUT 25c PER DOZEN. Promptly returned. Every blade guaranteed cut deep and honed to a razor edge by our specially designed machines. Precision handpiece reconstruction. Dependable, unrivaled service since 1906. Scheun Bur Works, 3104 S. Michigan Ave., Chicago, Illinois.

FOR SALE: TWENTY YEAR CALIFORNIA Exodontia and Surgical practice and equipment. Going strong. Retiring. Strict investigation invited. Do not reply unless you have at least $1,500 down payment. Address E-3838, American Dental Association, 212 E. Superior Street, Chicago, Illinois.

DULL BURS BOUGHT. Will also recut them on shares, or recut them regular. Schrader recut burs guaranteed to cut as good or better than any brand of new bur. For particulars, write, Schrader Instrument Co., Independence, Iowa.

FOR SALE: EQUIPMENT AND GOOD-WILL in residential Hyde Park, Chicago. Established forty-two years. A splendid opportunity. Address E-3842, American Dental Association, 212 E. Superior St., Chicago, Illinois.

FOR SALE: NICELY FURNISHED, good paying, established practice. Downtown Milwaukee, short hours. Will introduce purchaser. Very reasonable. Small down payment, terms. Dentist, 615 Bankers Bldg., Milwaukee, Wisconsin.

DENTAL ASSISTANT, THREE YEARS' EXPERIENCE, wishes position with dentist who will be exempt from draft. Capable of assisting at chair as well as general office duties. Melva Moden, Waterville, Kansas.

NOW BURS STONED like new, 25c per dozen. Our stoned burs are sharp, smooth running. Only perfect burs returned. Send burs today. Prompt return. Middlebury Bur Stoning Co., Middlebury, Ind.

WE BUY AND SELL used dental equipment. Western Metal Co., Bloomington, Illinois.

FOR SALE: WELL-ESTABLISHED ethical cash practice in good business district, Seattle, Washington. 100,000 increase in population, short on dentist. Retiring. Applicant must be licensed in Washington, exempt from service. Address E-3846, American Dental Association, 212 E. Superior St., Chicago, Illinois.

TO LET: (PART TIME). Fully equipped, Operating Room, with an ethical dentist, at Broadway and 41st Streets, New York City. Call Lackawanna 4-6633.

BUSINESS-APPOINTMENT CARDS. Standard Vellum 1,000 $1.75, 2,000 $3.00. Thinlucent Embossed Cards 1,000 $2.00, 2,000 $3.50. Postpaid. Send for samples. Letterheads, statements, envelopes. Louis Norton, 275 12th Street, Oakland, Calif.

BURS MACHINE CUT: 30c a dozen. In business since 1917. Testimonials from thousands of satisfied users. Our guarantee protects you. Hand pieces repaired. Monarch Bur Cutting Co., P. O. Box 57, Mishawaka, Indiana.

BURS RECUT—OUR OWN METHOD—to dentists only, dozen 25c. Every bur examined after refinishing and returned in 1 dozen stamped packages. Testimonials given. Sheun & Co., 6612 Sheridan, Chicago.

WANTED: MODEL E. CDX X-RAY, wall or pedestal type, Ritter laboratory lathe. Also Ritter, Castle or Pelton sterilizer. Must be in good condition. Cream white color preferred. Will pay cash. Address E-3837, American Dental Association, 212 E. Superior St., Chicago, Illinois.

BURS MACHINE CUT—Dull burs sharpened by machine 25 cents per dozen; in five gross lots, the next gross free. Stewart Dental Mfg. Co., 213 Elk Street, Syracuse, New York.

FOR SALE: ESTABLISHED DENTAL OFFICE in Illinois town of 10,000. Two-chair modern equipment, with x-ray. Price $1,800. Terms as desired. Retiring from private practice. Address E-3836, American Dental Association, 212 E. Superior St., Chicago, Illinois.

BURS RECUT BY THE CAPITOL gives you the satisfaction desired. Contra Angles repaired. Chromeplating done. Send your burs, Contra Angles to Capitol Bur Cutting Service, One Union Square, New York City.

DENTAL AUTO EMBLEM: This insignia quickly and definitely identifies you as a dentist. It has been designed as the insignia of the regular licensed practitioner of dentistry. The emblem embodies the Esculapian rod and the letters D.D.S. in maroon color on a lilac enamel background (official dental color), with new plate 24K gold finish. The bracket attachment is made of rust resisting metal, and is put onto the license plate easily. Sold to members of Local, State and American Dental Association since 1923. Emblem with bracket, $2.50. (Sets of 2 emblems, $4.50) Dental Emblem Co., P.O. Box 455, New Haven, Conn., or your dealer.

BURS RECUT: We have been recutting dental burs for more than twenty years and among our many satisfied customers are dentists both in this country and abroad. We make your old burs as good as many and better than some new burs. We recut and charge only for those burs that will give satisfaction in every respect. All burs are sorted and put up in cartons of one dozen each. Price 25c the dozen. Ordinary size laboratory burs 5c each. Western Metal Company, Bloomington, Illinois.

KING'S DENTURE ACRYLIC

meets A. D. A. Specification No. 12.

What more can be said? Except that it is only $7.00 per lb. (480 cc. powder, 180 cc. liquid) for medium pink, medium fine grain. 1 unit trial size, $1.00.

King's Tooth Acrylic for inlays, jackets, etc., is of same high quality. Kit to match all popular shade guides is $4.00. Lowest quantity rates on refills for kit.

Sturdy, bronze flask, well-designed, takes 6-tooth bridge, $2.50. Kit and flask, $6.00.

Write for details of these and other products.

ALFRED T. KING, D.D.S., 4930 W. 13th St., Cicero, Ill.

ATLAS OF DENTAL AND ORAL PATHOLOGY

Revised Edition

The material is presented by the case method from the cases in the Registry of Dental and Oral Pathology of the American Dental Association at the Army Medical Museum.

These cover comprehensively pathologic conditions of lips, cheeks, mouth, tongue, teeth, jaws and neck which come to the attention of the general practitioners and oral and maxillofacial surgeons.

$15.00 per copy

AMERICAN DENTAL ASSOCIATION
212 E. Superior St.,
Chicago, Ill.

PREFERRED BY DENTISTS EVERYWHERE

TORIT PAPER DISKS have fast-cutting abrasives—are evenly cut—guaranteed to have perfectly-centered holes. They can't be surpassed for quality in their price field.

ASK FOR SAMPLES and the Torit Disk Chart, which we'll send with a No. 14 Catalog, showing over 100 items that will interest you.

FREE — CATALOG SAMPLES

TORIT MANUFACTURING CO.
306 Walnut St. St. Paul, Minn.

For Partial Dentures use BROWN Precision ATTACHMENTS

Proximal Contact Type

Now in two types

Proximal Contact Cat. No.	Size		Plain Shank Cat. No.
227	.035" x .025"	(Flat)	None
321	.090" x .030"	(Flat)	312
322	.115" x .030"	(Flat)	315
323	.125" x .030"	(Flat)	313
324	.150" x .030"	(Flat)	305
325	.175" x .040"	(Flat)	310
None	.102" x .052"	(Oval)	304
None	.058" Dia.	(Round)	301
None	.064" Dia.	(Round)	302
None	.071" Dia.	(Round)	303

Strong • Easily Adjustable • Springy

PRICES
Round—$9.00 ea. Flat and Oval—$10.00 ea. complete.
Size Chart and Technical Literature on Request

COLUMBIA DENTOFORM CORP.
131 East 23rd Street New York, N. Y.

Where Shall I Go to Dental College?

ATLANTA-SOUTHERN DENTAL COLLEGE
Atlanta, Georgia
Four-Year Course Leading up to the D.D.S. Degree
MODERN BUILDINGS AND EQUIPMENT
AMPLE CLINICAL FACILITIES
ENTRANCE REQUIREMENTS
TWO YEARS OF COLLEGE WORK
SESSION OPENS OCTOBER FIRST
For catalog and information
write
RALPH R. BYRNES, D.D.S., F.A.C.D., Dean

BAYLOR UNIVERSITY COLLEGE OF DENTISTRY
DALLAS, TEXAS
For Catalog and full information address:
F. W. HINDS, D.D.S., Dean, 1420 Hall Street, Dallas, Texas

THE UNIVERSITY OF BUFFALO, SCHOOL OF DENTISTRY
A new curriculum known as the four-quarter plan was introduced in 1929-30, which permits a student to complete the regular four-year course in three calendar years, a saving of one year in time without reduction of the content of the prescribed course.
For further information address:
THE UNIVERSITY OF BUFFALO, SCHOOL OF DENTISTRY
25 Goodrich St., Buffalo, N. Y.

COLLEGE OF PHYSICIANS AND SURGEONS
of San Francisco, California
A
SCHOOL OF DENTISTRY
For further information and Catalog address:
THE REGISTRAR
344—14th Street, San Francisco, California

CREIGHTON UNIVERSITY
SCHOOL OF DENTISTRY
ADDRESS THE DEAN
26th and California — Omaha, Nebraska

Where Shall I Go to Dental College?

THE THOMAS W. EVANS MUSEUM AND DENTAL INSTITUTE
SCHOOL OF DENTISTRY, UNIVERSITY OF PENNSYLVANIA

A Prospectus and full information as to the fees for these courses may be obtained from the Dean

THE THOMAS W. EVANS MUSEUM AND DENTAL INSTITUTE
40th and Spruce Sts., Philadelphia, Pa.

THE UNIVERSITY OF KANSAS CITY,
SCHOOL OF DENTISTRY

THE KANSAS CITY-WESTERN DENTAL COLLEGE

For information, address

ROY JAMES RINEHART, Dean

Tenth Street and Troost Avenue — Kansas City, Missouri

LOYOLA UNIVERSITY SCHOOL OF DENTISTRY

New Orleans, Louisiana

For information and catalog address:
Registrar, Dental Department
SIDNEY L. TIBLIER, A.B., M.S., D.D.S., Dean

NORTH PACIFIC COLLEGE OF OREGON
SCHOOL OF DENTISTRY

For detailed information and catalog address
THE REGISTRAR
East Sixth and Oregon Sts., Portland, Oregon

NORTHWESTERN UNIVERSITY DENTAL SCHOOL

Catalog on request

Address
THE REGISTRAR, 311 E. Chicago Ave., Chicago, Ill.

Where Shall I Go to Dental College?

COLLEGE OF DENTISTRY
UNIVERSITY OF SOUTHERN CALIFORNIA

Forty-sixth Annual Session
1942-1943
Begins September 9, 1942

1. A four year course, leading to the degree of Doctor of Dental Surgery, based upon the completion of not less than a two-year pre-dental course as given in the College of Letters, Arts, and Sciences of the University of Southern California, or in any other college of approved standing.

2. A two-year course in dental hygiene, for women only, with two years of college work as the admission requirement, leading to the degree of Bachelor of Science in Dental Hygiene.

GRADUATE COURSE IN ORTHODONTICS

3. A graduate course in orthodontics requiring one calendar year of full-time attendance, or two calendar years of half-time attendance, leading to the degree of Master of Dental Science.

For bulletins and additional information address:

LEWIS E. FORD, D.D.S., D.D.Sc., F.A.C.D., Dean
Los Angeles Street at Sixteenth
Los Angeles, California

ST. LOUIS UNIVERSITY
SCHOOL OF DENTISTRY

For full information address
T. E. PURCELL, D.D.S., Grand Ave. and Caroline St., St. Louis, Mo.

TEMPLE UNIVERSITY DENTAL SCHOOL

The course leading to the D.D.S. Degree covers four academic years following two years of predental study in a recognized college of Liberal Arts and Sciences. Also, an Oral Hygienist's course of thirty-two weeks.

For additional information address:
DR. C. BARTON ADDIE, ACTING DEAN
1810 Spring Garden Street
Philadelphia, Pa.

THE TEXAS DENTAL COLLEGE

Enrollment for the session of 1942-43 is being completed now.

Address inquiries to
F. C. ELLIOTT, DEAN
The Texas Dental College
Houston, Texas

WASHINGTON UNIVERSITY, SCHOOL OF DENTISTRY

(Missouri Dental College)

Four-Year course, leading to the degree of D.D.S.
For further information address The Dean, 4559 Scott Ave., St. Louis, Mo.

PHYSICIANS CASUALTY ASSOCIATION
PHYSICIANS HEALTH ASSOCIATION

HOSPITAL
ACCIDENT
SICKNESS

INSURANCE

For Ethical Practitioners Exclusively
(57,000 POLICIES IN FORCE)

LIBERAL HOSPITAL EXPENSE COVERAGE FOR $10.00 PER YEAR

$5,000.00 accidental death $25.00 weekly indemnity, accident and sickness	For $32.00 per year
$10,000.00 accidental death $50.00 weekly indemnity, accident and sickness	For $64.00 per year
$15,000.00 accidental death $75.00 weekly indemnity, accident and sickness	For $96.00 per year

40 years under the same management

OVER $2,200,000. INVESTED ASSETS
OVER $10,750,000. PAID FOR CLAIMS

$200,000 deposited with State of Nebraska for protection of our members

"86 cents of each $1.00 of gross income is used for members' benefits"

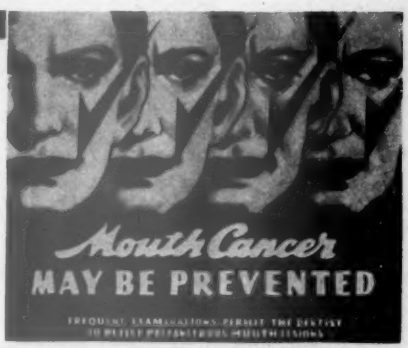
Full war coverage without increase in cost.

Send for application, Doctor, to
400 FIRST NATIONAL BANK BLDG., OMAHA, NEBRASKA

CANCER OF THE MOUTH POSTER

Five thousand and twelve deaths were attributable to intra-oral cancer in 1939 — approximately 3 per cent of the 153,000 deaths from cancer in that year.

This 28 by 23 inch, black, white and red poster will help educate people to prevent this form of the disease.



Bureau of Public Relations
American Dental Association
212 E. Superior St., Chicago, Ill.

Enclosed is:

- ☐ 35c for 1 Cancer of the Mouth Poster
- ☐ $3.00 for 10 posters
- ☐ $6.25 for 25 posters
- ☐ $10.00 for 50 posters
- ☐ $15.00 for 100 posters

Name_____

Street_____ City_____ State_____

Please print plainly full name and complete address.

Teeth, Health and Appearance

THIS BEAUTIFUL BOOK ANSWERS MOST OF THE MORE IMPORTANT DENTAL QUESTIONS

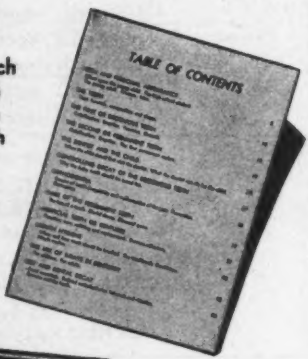
INDISPENSABLE FOR OFFICE, SCHOOL AND LIBRARY

AUTHORITATIVE
ARTISTIC
INFORMATIVE
INEXPENSIVE

Forty-eight 10½x14 inch pages illustrated with one hundred and one pictures, fifty of which are in four colors.

CASE BOUND
CLOTH COVER
Only

$1.50 postpaid



THE BUREAU OF PUBLIC RELATIONS - AMERICAN DENTAL ASSOCIATION
212 E. Superior St., Chicago, Ill.

THE BUREAU OF PUBLIC RELATIONS
AMERICAN DENTAL ASSOCIATION
212 E. Superior St., Chicago, Ill.

A BENEFICIAL PRODUCTION CIRCLE

Enclosed is $1.50 for copy of TEETH, HEALTH AND APPEARANCE.

Name_____

Street_____ City_____ State_____

Please print plainly full name and complete address.

Here's Why

It pays to ship gold scrap to

MOWREY'S

We do every step of the refining in our own modern plant. . . . We deal direct with you. . . . We make prompt returns at prices based on new gold market.

Send Us a Trial Shipment

There are *no better* refiners than
W·E·MOWREY CO·
Since 1899

1436 University Ave. St. Paul, Minn.

For YEARS and YEARS of PERFECT Service
Depend on **HANAU** *Equipment*
SEND FOR FREE CATALOG
HANAU ENGINEERING CO., INC. • 1235 MAIN ST., BUFFALO, N. Y.

DENTAL CARIES

FINDINGS AND CONCLUSIONS ON ITS CAUSES AND CONTROL

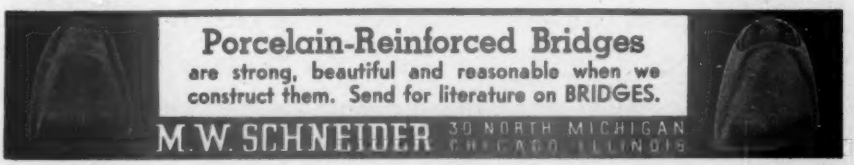
Second Edition. 277 Pages

Includes all material in First edition, i.e., 195 summaries by observers and investigators in 25 countries, with many revisions of summaries, as well as summaries by 42 additional authors or groups of authors in 12 countries.

Compiled by the Advisory Committee on Research in Dental Caries for the Research Commission of the American Dental Association.

$2.00 PER COPY

American Dental Association
212 E. Superior St., Chicago


Porcelain-Reinforced Bridges
are strong, beautiful and reasonable when we construct them. Send for literature on BRIDGES.
M. W. SCHNEIDER
30 NORTH MICHIGAN
CHICAGO ILLINOIS

Technical Exhibits Present Latest Improvements

TWO OF DR. MYERSON'S

4 Basic Typal Setups

FOR *Greater* NATURALNESS

A. Both centrals on line and normal direction.
B. Both laterals outward rotation and overlapping centrals.
C. Cuspids prominent and outward rotation.

A. Both centrals on line and normal direction.
B. Both laterals inside slightly overlapped by centrals and cuspids.
C. Cuspids prominent and outward rotation.

Here another triumph for Myerson research; a further contribution to greater naturalness! To facilitate true to nature setups, Dr. Myerson has now developed a system of basic irregularities which are intended as a guide to better selection.

True-Blend and Characterized Teeth come to you mounted in pink wax in an acrylic-like holder — ready for immediate try-in in the mouth. Using these basic setups (two of which are illustrated above) great variations in an unlimited number of natural setups can be achieved easily RIGHT ON THE CARD AS YOU RECEIVE IT.

Save this chart and write for further details

IDEAL TOOTH INCORPORATED CAMBRIDGE MASSACHUSETTS

TO A PEOPLE

TENSE, PERHAPS SMOKING

MORE THAN USUAL...

Philip Morris makes this unequivocal statement:

ONLY PHILIP MORRIS CIGARETTES HAVE BEEN PROVED* DEFINITELY AND MEASURABLY LESS IRRITATING TO THE SENSITIVE MEMBRANES OF THE NOSE AND THROAT.

A change to Philip Morris cigarettes is one small but important step toward the greater well-being of the nation.

PHILIP MORRIS

PHILIP MORRIS & CO. LTD., INC.
119 FIFTH AVENUE, N. Y.

* *Laryngoscope, Feb. 1935, Vol. XLV, No. 2, 149-154 — Laryngoscope, Jan. 1937, Vol. XLVII, No. 1, 58-60*

Journal Advertisements Are Dependable

The Niagara of Denture Adhesives

OVER THE YEARS

With the good will of the dentist, an unceasing flow of CO-RE-GA has gone forth from our manufacturing plants to help millions of patients throughout the world gain confidence with immediate, partial and full dentures.

WILSON'S
CO-RE-GA
(POWDERED)

THE PERFECT ADHESIVE FOR DENTURES

DOCTOR! *This Coupon is for your Exclusive Use*

PLEASE SEND FREE SAMPLES FOR PATIENTS

Dr._____

_____

_____

COREGA CHEMICAL COMPANY
208 ST. CLAIR AVE., N. W. CLEVELAND, OHIO

CO-RE-GA *is not advertised to the public*

INDEX TO ADVERTISEMENTS

June, 1942

Abbott Laboratories A-34
American Can Co. A-33
American Dental Association A-1
American Meat Institute A-36
Angelica Jacket Co. A-18
Antidolor Mfg. Co., Inc. A-3
Austenal Laboratories, Inc. A-35

Baker & Co., Inc. A-10
Bureau of Public Relations A-32, A-48
Butler Co., John O. A-30

Caulk Co., L. D. A-20
Clark-Cleveland, Inc. A-22
Classified Advertising A-42
College Directory A-44, A-45, A-46
Columbia Dentoform Corp. A-43
Cook Laboratories, Inc. A-3
Corega Chemical Co. A-52
Crescent Dental Mfg. Co. A-28

Dee & Co., Thomas J. ..... Cover
Dentists' Supply Co. of New York A-54
Du Pont de Nemours & Co., Inc., E. I. A-8, A-9

Eastman Kodak Co. A-19

Hanau Engineering Co., Inc. A-49

Ideal Tooth Incorporated A-50
Insurance Committee, A. D. A. A-27

Jelenko & Co., Inc., J. F. A-24, A-25
Johnson & Johnson A-2

Kerr Dental Mfg. Co. A-23
King, Dr. Alfred T. A-43
Kolynos Co. A-39

Medical Protective Co. A-38
Merck & Co. Inc. A-6
Minimax Co. A-17
Mizzy, Inc. A-31
Mosby Co., C. V. A-21
Mowrey Co., W. E. A-49

Ney Co., J. M. ..... Cover
Novocol Chemical Mfg. Co., Inc. A-40, A-41

Pepsodent Co. A-11
Philip Morris & Co., Ltd., Inc. A-51
Physicians Casualty & Health Ass'ns A-47
Premier Dental Products Co. A-26
Proco-Sol Chemical Co., Inc. A-29
Pycopé, Inc. A-7

Reynolds Tobacco Co., R. J. A-14
Ritter Dental Mfg. Co., Inc. A-5
Rorer, Inc., William H. A-38

Schneider Dental Laboratory, M. W. A-49
Stratford-Cookson Co. A-18

Ticonium A-15
Torit Mfg. Co. A-43

Universal Dental Co. A-4

Weco Products Co. A-16
Wernet Dental Mfg. Co. A-37
White Dental Mfg. Co., S. S. A-12, A-13

HERE'S WHY

Trubyte New Hue 20° Posteriors

- MINIMIZE TRAUMA
- ASSURE COMFORT
- RESTORE MASTICATING EFFICIENCY

❶ LOW CUSPS
Reduce interference in lateral movements.

❷ CUSPAL INCLINATION
Helps to stabilize dentures.

❸ NARROW OCCLUSAL CONTACT
Permits maximum comfort by minimizing occlusal trauma, even in knife-edge and flabby ridge conditions.

❹ MINIATURE FINE KNIVES, AMPLE FOOD TABLE
Miniature fine knives carved into occlusal surfaces permit efficient mastication. Wide food table follows nature's plan for proper mastication.

TRUBYTE NEW HUE TEETH

Translucent ***Fluorescent***

"A Form for Every Face . . . A Size for Every Case . . . and A Shade for Every Complexion"

THE DENTISTS' SUPPLY COMPANY OF NEW YORK
220 West 42nd Street New York, N. Y.